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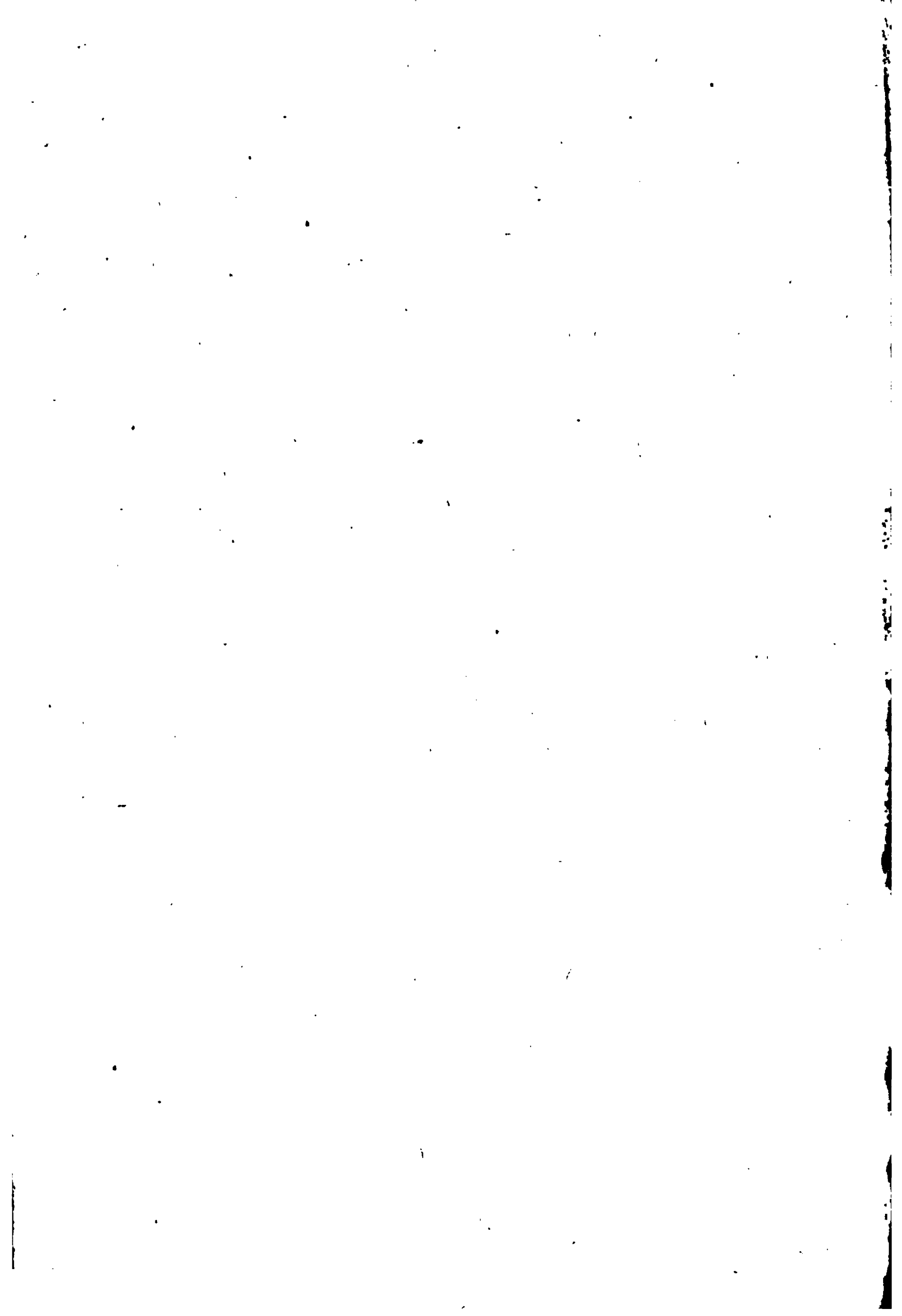
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UNIVERSITY BULLETIN,
New Series, Vol. III, No. 9.

UNIV. OF MICH
AUG 8 '01

UNIVERSITY OF MICHIGAN, *Ann Arbor, Mich.*

11. 11. 1901

DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

GRADUATE SCHOOL

ANNUAL ANNOUNCEMENT

FOR

1902-1903

ANN ARBOR
PUBLISHED BY THE UNIVERSITY
1902

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

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1902

CALENDAR

1902.

Sept. 17-20. *Examination for Admission to the Department of Literature, Science, and the Arts*

Sept. 23. FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY

Nov. — Thanksgiving Recess of three days, beginning Tuesday evening, in all Departments of the University

Dec. 19. (Evening) Holiday Vacation begins in all Departments

1903.

Jan. 6. Exercises resumed

Feb. 6. (Evening) FIRST SEMESTER CLOSES

Feb. 9. SECOND SEMESTER BEGINS

April 10. (Evening) Recess begins, ending April 20 (evening)

June 18. COMMENCEMENT IN ALL DEPARTMENTS OF THE UNIVERSITY

ADMINISTRATIVE COUNCIL

JAMES B. ANGELL, LL.D., *President*

ALBERT B. PRESCOTT, M.D., LL.D., *Director of the Chemical Laboratory, and Professor of Organic Chemistry*

REV. MARTIN L. D'OUGE, LL.D., *Professor of the Greek Language and Literature*

WILLIAM H. PETTEE, A.M., *Professor of Mineralogy, Economic Geology, and Mining Engineering*

ISAAC N. DEMMON, LL.D., *Professor of English and Rhetoric*

ALBERT H. PATTENGILL, A.M., *Professor of Greek*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory*

VOLNEY M. SPALDING, PH.D., *Professor of Botany*

HENRY C. ADAMS, LL.D., *Professor of Political Economy and Finance*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts*

ALBERT A. STANLEY, A.M., *Professor of Music*

FRANCIS W. KELSEY, PH.D., *Professor of the Latin Language and Literature*

OTIS C. JOHNSON, PH.C., A.M. *Professor of Applied Chemistry*

PAUL C. FREER, PH.D., M.D., *Professor of General Chemistry and Director of the Laboratory of General Chemistry*

ANDREW C. McLAUGHLIN, A.M., LL.B., *Professor of American History*

ASAPH HALL, JR., PH.D., *Professor of Astronomy and Director of the Observatory*

ISRAEL C. RUSSELL, C.E., LL.D., *Professor of Geology*

WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology*

JACOB REIGHARD, PH.B., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum*

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory*

JAMES A. CRAIG, PH.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek*

JOHN C. ROLFE, PH.D., *Professor of Latin*

J. PLAYFAIR McMURRICH, PH.D., *Professor of Anatomy*

ROBERT M. WENLEY, Sc.D., LL.D., *Professor of Philosophy*

ELIZA M. MOSHER, M.D., *Professor of Hygiene*

GEORGE HEMPL, PH.D., *Professor of English Philology and General Linguistics*

ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching*

FRED N. SCOTT, PH.D., *Professor of Rhetoric*

MAX WINKLER, PH.D., *Acting Professor of German*

FREDERICK G. NOVY, Sc.D., M.D., *Junior Professor of Hygiene and Physiological Chemistry*

EDWARD D. CAMPBELL, B.S., *Junior Professor of Analytical Chemistry*

FRED M. TAYLOR, PH.D., *Junior Professor of Political Economy and Finance*

ALEXANDER ZIWET, C.E., *Junior Professor of Mathematics*

GEORGE W. PATTERSON, JR., PH.D., *Junior Professor of Electrical Engineering*

FREDERICK C. NEWCOMBE, PH.D., *Junior Professor of Botany*

ALLEN S. WHITNEY, A.B., *Junior Professor of the Science and the Art of Teaching*

G. CARL HUBER, M.D., *Junior Professor of Anatomy*

JOHN O. REED, PH.D., *Junior Professor of Physics*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy*

JOSEPH H. DRAKE, PH.D., *Junior Professor of Latin and Roman Law*

JOSEPH L. MARKLEY, PH.D., *Assistant Professor of Mathematics*

CHARLES H. COOLEY, PH.D., *Assistant Professor of Sociology*

MOSES GOMBERG, Sc.D., *Assistant Professor of Organic Chemistry*

S. LAWRENCE BIGELOW, PH.D., *Assistant Professor of General Chemistry*

ANNOUNCEMENT OF THE GRADUATE SCHOOL

GENERAL INFORMATION

The University of Michigan

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental Announcement. In the several faculties there were in 1901-1902, 173 officers of instruction, besides numerous assistants, some of whom participated in the work of teaching. Including the Summer Schools, 3,709 students, representing 51 States and Territories, and 13 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1901-1902, 103 regular teachers and 32 assistants. The students in attendance numbered 1,400, of whom 107 were graduates. The presence of such a number of graduate students, taken with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Libraries

The various libraries of the University contain about 155,000 volumes, and include a number of important special collections.

Among these are the McMillan Shakespeare Library, 5,018 volumes; the Parsons Library (political science), 4,325 volumes; and the Goethe Library of about 1,000 volumes. The general reading room seats 210 readers, and separate rooms are provided for advanced students to work in, with the necessary books close at hand. Under certain restrictions graduate students have access to the book rooms. The library takes 867 periodicals, and is open, in term time, fourteen hours daily, except on Sundays and legal holidays. During the summer vacation it is open nine hours a day during the summer session, and six hours a day for the remainder of the time.

The Laboratories

The University has an observatory and a large number of laboratories more or less fully equipped for routine instruction and for original research. The laboratories (omitting those connected exclusively with the work of the Engineering, Medical, and Dental Schools) are: the Anatomical, Botanical, Chemical, Geological, Histological, Hygienic, Physical, Physiological, Psychological, and Zoological. For a fuller account of them and their various resources, as also of the University collections for the study of art, archæology, ethnology, mineralogy, palæontology, systematic zoology, etc., consult the annual Calendar, which may be had *gratis* on application to Mr. James H. Wade, Secretary of the University.

Societies

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc.

ORGANIZATION OF GRADUATE WORK

The Graduate School

The Graduate School was organized in the Spring of 1892 in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous ad-

vanced courses offered in that department—courses that have developed during the past few years from the continual extension of the elective system,—and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of the higher work, and, so far as possible, for the separate instruction of graduate students. It also aims to lay foundations for the future development of university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council, of which the President of the University is chairman.

The regulations of the University respecting graduate work that were formerly in force, have been modified in a few particulars by the Council, and it is possible that still further changes may be made in the year to come. The more important of these regulations are explained in the pages that follow.

The University System

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of an original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a *master's* degree. It may be added also that for the master's degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Graduate students who do not wish to work for a higher degree

are admitted to any course offered in the Department of Literature, Science, and the Arts, upon satisfying the professor in charge that they are qualified to pursue the work to advantage.

THE HIGHER DEGREES

Degrees Conferred

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees

A Bachelor of this University, or of any other reputable university or college, may become a candidate for a master's degree, and may be recommended for the degree after one year's residence at the University, provided he pass a satisfactory examination on the course of study approved by the Administrative Council. A thesis may, or may not, be included in the requirements for a degree, as the committee in charge of the student's work may determine.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The practice of allowing graduates of this University to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.*

A student properly qualified may be permitted to pursue at the same time studies for a master's degree and studies in any of the professional schools, on condition that the term of study and residence in the Graduate School be extended to cover at least two years.

The Doctors' Degrees

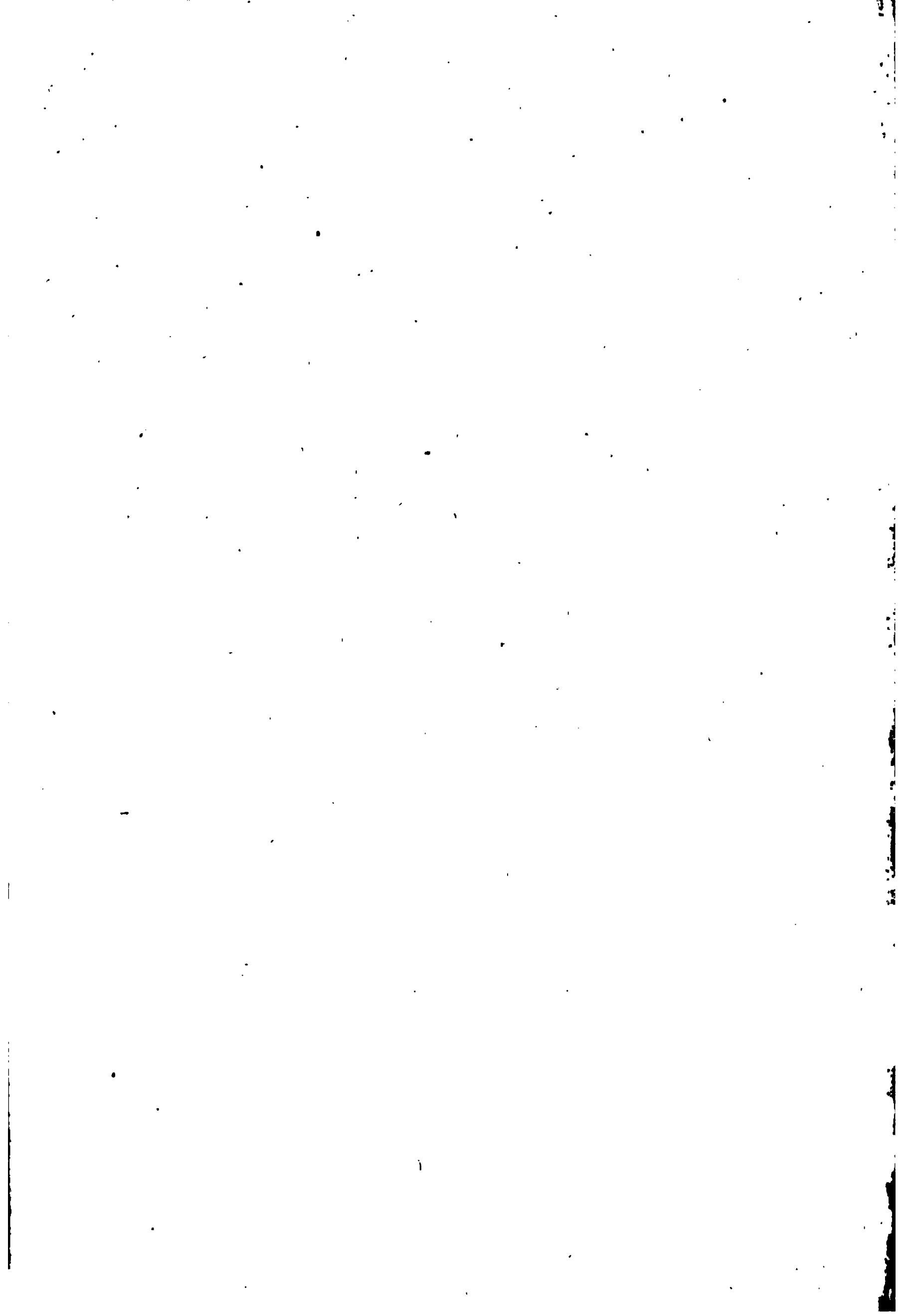
1. The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research. The degree of Doctor of Phi-



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UNIVERSITY BULLETIN.
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UNIV. OF MIC
AUG 8 1901

UNIVERSITY OF MICHIGAN, *Ann Arbor, Mich.*

As. Prof. ...

DEPARTMENT OF LITERATURE, SCIENCE,
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FIRST SEMESTER

Professor D'Ooge:—

Seminary in Tragedy.

Several of the plays of Euripides will be read and discussed, with special reference to the dramatic art of the poet, his innovations, his relation to his period, and the antiquities of the Greek stage. *Three hours a week.*

[Studies in Sophocles, with special reference to the dramatic art of the poet, his use of meters, and the antiquities of the Greek stage.—*Three hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

The History of Greek Art from the Beginning to the Roman Period.

Gardner's Handbook of Greek Sculpture and Tarbell's History of Greek Art will be made the basis of a more general study.—*Three hours a week.*

Lectures on Greek Grammar,

Particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week.*

Plato and Aristotle.

The *Gorgias* of Plato and the *Nicomachean Ethics* of Aristotle. *Two hours a week.*

[Lucian:

The Dream, Charon, Timon, the Dialogues of the Gods, Dialogues of the Dead, and other pieces, will be read, with discussion of the life and times of Lucian.—*Two hours a week.*

Omitted in 1902-03; to be given in 1903-04.]

Professor PATTENGILL:—

Thucydides.

A course of reading and of study of the Peloponnesian War.—*Three hours a week.*

[Isaeus.

A study of the legal antiquities of Athens.—*Three hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

Lectures on the history of the Homeric text, and a study of the Homeric language and verse. A critical reading and interpretation of portions of the Iliad. This course is especially intended for those who are preparing themselves to teach Greek.—*Three hours a week.*

The Athenian Constitution of Aristotle.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week.*

Modern Greek.

A practical introduction, and practice in reading specimens of modern Greek literature.—*Two hours a week.*

[Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

[Seminary in Plato's Republic.

Two hours a week.

Omitted in 1902-1903; to be given in 1903-1904.]

[Greek Comedy.

The Clouds, the Acharnians, and The Frogs of Aristophanes will be read, and the characteristic qualities of Greek comedy will be discussed.—*Two hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

Professor PATTENGILL:—

The Greek Bucolic Poets.

The idyls of Theocritus, Bion, and Moschus.—*Three hours a week.*

be given for the benefit of students preparing for nations, or for the fellowships at Rome or elsewhere an examination is a prerequisite.— *One hour a semester.*

—

Hispanic Private Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages, and a discussion of the relations of Roman Law to modern systems of law.— *One hour a week, first semester.*

Roman Political Institutions.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reason for the failure of the constitution of the Republic in the establishment of the Principate by Augustus. strongly recommended to classical students.

Professor KELSEY:—

Latin Seminary: Juvenal.

Open to graduate students only.— *Two hours a week, throughout the year.*

Cæsar's Gallic War (Teachers' Course, A). Open to graduates and fourth-year undergraduates.

Lectures. Papers prepared by those taking the course. Critical study of the text of the Gallic War, on the basis of Meusel's edition; studies in the syntax and military antiquities.— *Five hours a week, first semester.*

Virgil (Teachers' Course, B). Open to graduates and fourth-year undergraduates.

Critical study of select portions of the Bucolics, Georgics, and Aeneid, on the basis of Ribbeck's large edition.— *Five hours a week, second semester.*

[Introduction to Classical Philology.

Lectures. A brief outline of the history and present condition of classical studies is presented; followed by an extended discussion of the methods employed in classical philology. Attention is also

paid to the bibliography of the subject.— *Three hours a week, second semester.* This course will be omitted in 1902-1903.]

Juvenal. Open to graduates and to fourth-year undergraduates.

Interpretations and lectures.— *Two hours a week, first semester.*

Professor D'OUGE:—

Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text, and a study of the Homeric language and verse. A critical reading and interpretation of portions of the Iliad. This course is especially intended for those who are preparing themselves to teach Greek.— *Three hours a week.*

The Athenian Constitution of Aristotle.

With special reference to the judicial and political antiquities

Professor ROLFE:—

Latin Grammar.

Lectures on the phonology and morphology and syntax of the Latin language. *Two hours a week, throughout the year.*

Latin Inscriptions.

Reading of inscriptions of different periods illustrating the history of the Latin language.— *Two hours a week, second semester.*

[The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.— *Two hours a week, second semester.* This course will be omitted in 1902-03.]

[Vulgar Latin.

Lectures on the *sermo cottidianus* and *sermo plebeius*, with special reference to the Romance Languages. Reading of selected authors and inscriptions.— *Three hours a week, first semester.* This course will be omitted in 1902-03.]

Professor ROLFE and Professor DRAKE:—

Reviews of Roman Literature, Latin Grammar, and Roman Legal and Political Institutions.

Systematic reviews of the subjects mentioned in the title to

this course will be given for the benefit of students preparing for graduate examinations, or for the fellowships at Rome or elsewhere, for which an examination is a prerequisite.— *One hour a week, second semester.*

Professor DRAKE:—

History of Roman Private Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages, and a discussion of the relations of Roman Law to modern systems of law.— *One hour a week, first semester.*

Roman Political Institutions.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reason for the failure of the constitution of the Republic and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted whenever it is possible.— *Two hours a week, first semester.*

The Institutes of Roman Private Law.

Lectures. An outline of the fundamental principles of Roman Law as given in the institutes of Gaius and Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English law.— *Two hours a week, second semester.*

Roman Provincial Administration.

Lectures. An outline of the administrative system of the Roman Provinces, preceded by a short account of the geographical extension of Rome through her conquests, and followed by a consideration of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.— *One hour a week, second semester.*

[Proseminary in Roman Constitutional Law.

Lectures, topical readings and reports on assigned subjects in Roman constitutional development. The general theme of the course in 1901-1902 was the Progressive Subdivision of the Magistracy as portrayed in the earlier books of Livy.— *Two hours a week, first semester.* This course will be omitted in 1902-1903.]

[The Digest of Justinian.

Study of selected titles of the Digest. *Two hours a week, second semester.* This course will be omitted in 1902-03.]

Dr. SANDERS and Dr. MEADER: —

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Dr. SANDERS: —

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

[The Georgics of Virgil.

Interpretation, with lectures on the ancient writers on agriculture.—*Two hours a week, second semester.* Omitted in 1902-03.]

Elegiac Poets.

Catullus, Tibullus, and Propertius. Interpretations, with lectures on Roman Elegy.—*Two hours a week, second semester.*

Dr. MEADER: —

Christian Latin.

Translation of selected passages from the Patristic writings, with lectures on Christian art and Archæology.—*Two hours a week, second semester.*

SANSKRIT

Before beginning the study of Sanskrit, the student should have pursued courses in Greek and Latin for at least four semesters, or, instead of either Greek or Latin, Germanics of the early period.

Dr. SANDERS:—

Greek Epigraphy.

A study of the local alphabets and the reading of the more important inscriptions written in them.—*Two hours a week.*

SECOND SEMESTER

Professor D'OUGE:—

Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text, and a study of the Homeric language and verse. A critical reading and interpretation of portions of the Iliad. This course is especially intended for those who are preparing themselves to teach Greek.—*Three hours a week.*

The Athenian Constitution of Aristotle.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week.*

Modern Greek.

A practical introduction, and practice in reading specimens of modern Greek literature.—*Two hours a week.*

[Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

[Seminary in Plato's Republic.

Two hours a week.

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[Greek Comedy.

The Clouds, the Acharnians, and The Frogs of Aristophanes will be read, and the characteristic qualities of Greek comedy will be discussed.—*Two hours a week.*

Omitted in 1902-1903; to be given in 1903-1904.]

Professor PATTENGILL:—

The Greek Bucolic Poets.

The idyls of Theocritus, Bion, and Moschus.—*Three hours a week.*

[The Greek Minor Poets.

Selections from the Anthology.— *Three hours a week,*
Omitted in 1902-1903; to be given in 1903-1904.]

Dr. SANDERS:—

~~Greek Palaeography.~~

History of Roman Private Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages, and a discussion of the relations of Roman Law to modern systems of law.— *One hour a week, first semester.*

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Professor KELSEY:—

Latin Seminary: Juvenal.

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Critical study of select portions of the Bucolics, Georgics, and Aeneid, on the basis of Ribbeck's large edition.— *Five hours a week, second semester.*

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Lectures. A brief outline of the history and present condition of classical studies is presented; followed by an extended discussion of the methods employed in classical philology. Attention is also

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THE HIGHER DEGREES

Degrees Conferred

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees

A Bachelor of this University, or of any other reputable university or college, may become a candidate for a master's degree, and may be recommended for the degree after one year's residence at the University, provided he pass a satisfactory examination on the course of study approved by the Administrative Council. A thesis may, or may not, be included in the requirements for a degree, as the committee in charge of the student's work may determine.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The practice of allowing graduates of this University to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.*

A student properly qualified may be permitted to pursue at the same time studies for a master's degree and studies in any of the professional schools, on condition that the term of study and residence in the Graduate School be extended to cover at least two years.

The Doctors' Degrees

1. The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research. The degree of Doctor of Phi-

losophy is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Doctor of Science.

2. It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study, and no definite term of required residence can be specified. As a rule, three years of graduate study will be necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work.

3. No student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. [This rule may be waived in the case of those who come properly accredited from a Graduate School of some other university, and of those who, as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.]

4. A student wishing to become a candidate for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

5. A candidate for a doctor's degree must take a major study that is substantially co-extensive with some one department of instruction in the University. He must also take two minor studies, one of which may be in the same department as the major, but involving a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council.

6. THE THESIS.—The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but it must depend for acceptance more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

Special Regulations Relating to the Higher Degrees

1. Applicants for an advanced degree are required to announce to the Council, through the Secretary, as early as the tenth of October of each year, the particular branches of study to which they wish to give special attention. The supervision of their work will then be entrusted to the proper committee.

2. The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

3. The thesis must be completed and put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

4. The thesis must be prepared for close scrutiny with reference not only to its technical merits, but also to its merits as a specimen of literary workmanship. It must be preceded by an analytical table of contents, and a carefully prepared account of the authorities used.

5. The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

6. Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of his thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. He is also required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities; — provided, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee. To guarantee the printing of the thesis, every candidate for the doctor's degree is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars, which deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended.

ADMISSION AND REGISTRATION

All applicants for admission to the Graduate School must first report to the Dean of the Department of Literature, Science, and the Arts, and present their credentials. They will then be referred to the Secretary of the Administrative Council for the arrangement of courses of study.

The privileges of the school are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the school.

Graduates of institutions where the undergraduate courses of study are not substantially equivalent to the course prescribed at this University, are ordinarily required to do an additional amount of undergraduate work, or to prolong their term of residence, before being admitted to full candidacy for a higher degree.

Graduates of this University, or of other institutions, who do not wish to become candidates for a degree, may be admitted and registered as special resident graduates.

Graduates of other institutions who are candidates for a bachelor's degree in the Department of Literature, Science, and the Arts, are not registered in the Graduate School.

FEEES AND EXPENSES

Matriculation Fee — Every student before entering any department of the University is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee — In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the

first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or graduate shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Laboratory Expenses—Students who pursue laboratory courses of study are required to pay for the materials and apparatus actually consumed by them. The deposits required in advance are different in the different courses, ranging from one to twenty dollars. The laboratory expenses of students will vary with their prudence and economy. Experience has shown that in the chemical laboratory the average expense for all courses is about one dollar and twenty cents a week.

Diploma Fee—The fee for the diploma given on graduation is ten dollars, and the by-laws of the Board of Regents prescribe that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Other Expenses—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half, a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

FELLOWSHIPS

Elisha Jones Classical Fellowship

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University, in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and

must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President ANGELL and Professors D'OOGHE, KELSEY, HUDSON, and PATTENGILL. The period of incumbency is limited to two academic years, and must be spent at this University "unless at any time the examining board shall see fit to allow the second year to be spent" at some other place favorable to classical study.

Fellowship in Chemistry

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1901-1902 of the Fellowship in Chemistry established by them in 1895. Professors VAUGHAN, PRESCOTT, and FREER were designated to act as a committee to select the incumbent and to arrange the work in accordance with the wishes of the donors. The holder of the Fellowship for the year 1901-02. is George Fletcher Richmond, M.S.

Peter White Fellowship

Provision for a Fellowship in American History for the year 1901-02. with an income of four hundred dollars, was made by Honorable Peter White, of Marquette. The holder of the Fellowship for the year is Theophil John Zimmerman, A.B.

Dexter M. Ferry Botanical Fellowship

Provision for a Fellowship in Botany for the year 1901-1902, with an income of five hundred dollars, was made by Mr. Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year is Joseph William Tell Duvel, B.S.

Stearns Fellowship

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars.

Gas Engineering Fellowship

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of a Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for

History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed.—*Two hours a week, throughout the year.*

GOTHIC

Dr. DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN

Dr. BOUCKE:—

[Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *Altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week throughout the year. Omitted in 1902-03, to be given in 1903-04.]*

JOURNAL CLUB —

Current Literature on Germanic Philology and Literature.

Meetings of instructors of the German department and of advanced students are held once a fortnight throughout the year, at which reports are made on the important contributions to German philology and literature.

For a full description of the courses and the organization of the work in German in the University, consult the Special Announcement of the Department of the Germanic Languages and Literatures for 1902-1903.

ENGLISH PHILOLOGY AND GENERAL LINGUISTICS

The work of this department is concerned with the study of (1) the mother tongue, (2) the life and growth of language in general, and (3) the teaching of language.

Professor HEMPL:—

Old English.*

A general introduction to the subject.—*Four hours a week, first semester.*

Old-English Phonology and Morphology.

This course consists of lectures on the history of Old-English sounds and forms, together with the private reading of Old-English prose texts and the investigation of two or three problems.—*Two hours a week, second semester.*

[Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester. Omitted in 1902-1903.]*

Middle English.

This course consists of a brief introduction to the subject, the private reading of several of Chaucer's works, and the study of some of the more important questions of Chaucer's workmanship.—*Two hours a week, first semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern-English Grammar.

This course is intended specially for candidates preparing to teach English.—*Two hours a week, second semester.*

Special Problems.

This course consists in the investigation of a series of special problems in English philology, dealing chiefly with the historical

* The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

development of certain phases of English speech.— *Two hours a week, each semester.*

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.— *Two hours a week, first semester.*

The Teaching of Modern Foreign Languages.

It is the object in this course to give practical instruction in the teaching of modern foreign languages, as well as advice in the matter of preparation for teaching. There will also be given a brief survey of the most important methods now employed.— *Two hours a week, second semester.*

The Principles of Linguistic Science.

Lectures on the most important phases of the life and growth of language. It is the object in this course to furnish to students of either classical or modern languages an explanation of the phenomena of the languages they are studying, and to bring these scattered data into connection with the underlying principles.— *Two hours a week, second semester.*

ENGLISH AND RHETORIC

The advanced work of this department proceeds along two main lines: English and American Literature, and Rhetoric. Advanced courses in Oratory are also offered in connection with this department.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the courses given in recent years are the following: The Development of the English Novel; The English Satirists of the Seventeenth and Eighteenth Centuries; The Romantic Revival in England at the close of the eighteenth century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

See also the courses in English Philology and General Linguistics on pages 30 and 31.

Professor DEMMON:—

English Literature Seminary.

Each student is expected, first, to present two papers during the

semester, one an essay upon an assigned masterpiece, the other a critique of a fellow-student's essay; second, to participate each week in a general *ex tempore* discussion of the work under consideration; third, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Areopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book I; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Browning's Soul Tragedy; Tennyson's Maud; Swinburne's Atalanta in Calydon.—*First semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; Richard III; the two parts of Henry IV; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth; Coriolanus.—*Second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctly American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Principles of Criticism.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*Throughout the year.*

Studies in the text of Shakespeare.

The aim will be to illustrate the methods of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

Professor SCOTT:—**Seminary in the History and Theory of Rhetoric.**

The principal subjects of discussion are: (1) The development of rhetorical theory from Plato to the present time; (2) the fundamental postulates of the science of rhetoric.—*Two hours a week throughout the year.*

Principles of Style.

Inductive study of masterpieces of English prose, with a view to verifying rhetorical principles. Lectures, readings, discussions.
Two hours a week, first semester.

Theory of Prose: Narrative.

Two hours a week, second semester.

Interpretations of Literature and Art.

Two hours a week, first semester.

Teachers' Course.

Methods of teaching English Composition and Rhetoric.—*Second semester.*

The course includes (1) a discussion of the principles — æsthetic, psychological and sociological — which underlie the most notable theories of rhetoric and composition; (2) an application of these principles to certain urgent problems in the teaching of English; (3) practical suggestions with reference to the planning and management of composition work in secondary schools; (4) a critical examination of recent text-books.

Professor TRUEBLOOD:—**Study of Great Orators, ancient and modern.**

Lectures on methods of public address and source of power. Study of representative selections. The method is similar to that in the English Literature Seminary.—*Throughout the year.*

Oral Discussions.

This course is designed to develop readiness of extemporization. It involves the application of the principles of formal logic and elocution in the discussion of leading topics of the day. Students are required to present briefs of the subjects discussed.—*Throughout the year.*

MUSIC

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearn's Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the latest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

First Group.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

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Second Group.

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Researches in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or a minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY

Professor HUDSON:—

The History of Europe Since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russia on the Pacific and in central Asia, the attitude of the

powers toward China, the partition of Africa, and the problem raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

Two hours a week, throughout the year.

During the first semester lectures are given upon the more important phases in Russian history, since the accession of Peter the Great. Part of each session is given to reports made by students on subjects assigned to them for the semester's work. The questions deal with the causes of the present advance of Russia and with the problems which it presents. During the second semester, lectures are given, tracing the history of the relations of China with the western nations, and reports are made by students upon various phases of the present situation in the Far East.

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Assistant Professor Dow:—

Studies in Mediæval and Early Modern European History.

Two hours a week, throughout the year.

This work constitutes a cycle of three courses, each running through two semesters. It thus varies in subject matter from year to year, and may be elected several times. The first course (9a and 10a) in the cycle relates to the history of France, and chiefly to institutions. In the first semester a study is made of the institutions of the feudal period; in the second, attention is directed to changes that took place in the later mediæval and early modern periods. The second course (9b the first semester, and 10b the second) is devoted to a study of special topics, relating chiefly to Italy, Germany, and the church from the decline of Rome to the end of the thirteenth century. The third course (9c and 10c) treats of the period of the Renaissance and the Reformation, and consists, like the other two, of a series of logically related special studies. The third course is the one to be given in 1902-1903. The aim of the work, aside from gaining an intensive

knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied, especially in preparing oral and written reports.

Seminary in Mediæval History.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatics, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.— *Two hours a week, throughout the year.*

Dr. CROSS:—

English History.

Two hours a week, throughout the year.

An advanced course in English History is given each semester, consisting of lectures illustrated by selections from contemporaneous documents, assigned reading, and written reports. The first course deals with the origin and development of institutions in the mediæval period; the second is concerned mainly with the constitutional aspects of the Puritan Revolution.

Assistant Professor FAIRLIE:—

Federal Administrative Law.

This is a course in the broad principles and working machinery of the national administration, rather than a technical legal study. After tracing the development and present status of the theory of the separation of powers, it considers the organization and functions of the different branches of the federal service. This includes the administrative authority of the President, resulting from his powers of appointment, removal, and ordinance; the control of the Senate over appointments and treaties; the eight executive departments and the detached bureaus; the centralized system of local agents of the federal government in the customs, internal revenue, and postal services; the special administrative

tribunals, such as the board of customs appraisers; and the system of competitive examinations for subordinate positions, conducted by the Civil Service Commission.—*Three hours a week, first semester.*

State and Local Administration in the United States.

This course will present a general and comparative survey of government in the different states of the American Union, with special attention to the administrative authorities. Some time will be given to constitutional development, the structure and functions of the legislatures and the judicial systems. The study of governors, state officers, and boards will demonstrate the lack of organization in state as compared with national administration. Local self-government in counties, towns, and cities will be discussed, with a comparison of the different systems and relative merits of legislative, judicial, and administrative control. Finally party organizations and their influence on elections and on the working of the governmental machinery will be examined.—*Three hours a week, second semester.*

The Government of Michigan.

After studying constitutional and political development in the state from the Northwest Ordinance of 1787 through the two state constitutions to the present time, the various organs of state and local government are studied in turn: legislative, judicial, and administrative organization; local self-government in counties, towns, and cities; state institutions and their management; and election methods. The state constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods, and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, first semester.*

Administrative Law in England, France, and Germany.

In this course special attention will be given to the English local administration, showing the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system, the combination of bureaucratic and popular administration in Prussia, and the system of special administrative courts which exists in both countries. The central administration of these countries will also be considered, including the chief executives and the ministerial departments, with an account of the systems of examinations and training for the civil service. The study naturally brings out striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.

Students will find a reading knowledge of French and German advantageous; but this will not be an essential requirement.—*Three hours a week, second semester.*

Municipal Administration.

The course given the first semester deals with municipal development and the functions of municipal government; in the second semester a study is made of municipal organization, methods of central control, and local politics. The historical part considers briefly ancient and mediæval cities, and more at length English American and nineteenth century development. The discussion of municipal activities includes the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting, and street railways; and in each field there is a study of development, present conditions, and methods of administration in the cities of America and Europe, with a discussion of disputed problems, such as the control of the police and municipal ownership.

The second semester course begins with a study of municipal organization in America, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council, and the systems of France and of Prussia. This is followed by a study of legislative, judicial, and administrative control over municipal officials in the various countries. The last part of the course deals with party machinery, reform organizations, recent

legislation concerning primaries and the relation of politics to municipal administration.— *Three hours a week, throughout the year.*

Seminary in Administration.

These are courses for critical research on special topics. During the first semester, an investigation will be made of the working and results of the system of competitive examinations for the civil service. In the second semester special attention will be given to problems in municipal administration.— *Two hours a week, throughout the year.*

AMERICAN HISTORY

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extending over two years and a half, beginning with lectures on colonial history, and ending with a seminary, in which special problems are investigated in original material. Reference may also be made to a course in the principles of Constitutional law and the Political Institutions of the United States, which is given in the Department of American history, and is fitted into other work that is more strictly historical in character. A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history.

Professor McLAUGHLIN:—

American Colonial History.

Three times a week, second semester.

The purpose of this course is to trace the development of our early history as far as the Revolution. The students are expected to learn the main outline of facts from a text-book. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, to cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the

English colonies, and to the growth of American institutions and principles.

Constitutional and Political History of the United States, 1775-1861.

Three times a week, throughout the year.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully the more significant Constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. In the first semester chief attention is devoted to the origin of the Constitution and its practical interpretation in the early years. In the second semester an effort is made to trace the political and social development of the country. Emphasis is laid on constitutional problems and on the divergence between North and South, which ended in the Civil War.

Seminary in American History.

Two hours a week, throughout the year.

This course is primarily for graduate students who have already done a good deal of historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. In 1901-1902 the period under investigation was the early revolutionary era, 1765-1775. In 1902-1903 the ten years preceding the adoption of the Constitution will be studied. Graduate students will receive individual attention and assistance in the prosecution of their investigations.

PHILOSOPHY

The advanced courses described below and marked with an asterisk (*) presuppose instruction in logic, ethics, and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, mediæval, and modern. Candidates for a higher degree who have not had a preparation equivalent to this are expected to take certain of the lower courses, either before entering upon, or in connection with,

their graduate work. Advanced courses bearing upon the history of philosophy are also given in the departments of Greek, Latin, French, and German. The courses in mathematics are strongly recommended for students specializing in philosophy.

A. HISTORY OF PHILOSOPHY

Professor WENLEY:—

***The Philosophy of Kant.**

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

***The Philosophy of Hegel.**

Study of the Logic and discussions.—*Two hours a week, second semester.*

Professor LLOYD:—

The History of Philosophy.

A general outline of the subject from Thales to the present century. The course is designed to state the development of philosophical problems and concepts, and thus to give the student his bearings in philosophy. It is therefore highly advisable, if this course has not been taken before beginning graduate work, that it be taken at once upon beginning it.—*Three hours a week, throughout the year.*

***Philosophy since Hegel.**

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Philosophy of History.

Lectures and study of special periods.—*Two hours a week, first semester.*

Assistant Professor REBEC:—

American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

***Plato's Republic.**

Collateral reading and theses.—*Two hours a week, first semester.*

B. ETHICS

Professor LLOYD:—

Metaphysic of Ethics.

Lectures on the metaphysical implications of ethical theory.—
Two hours a week, second semester.

Systematic Ethics.

Lectures on ethical theory. Application of psychology to a theory of conduct.— *Two hours a week, second semester.* This course alternates with the preceding course, and is not given in 1902-03.

Assistant Professor REBEC:—

*Aristotle's Ethics.

Collateral reading and theses.— *Two hours a week, second semester.*

C. PSYCHOLOGY

The Psychological Laboratory is well equipped for original investigation.

Assistant Professor PILLSBURY and ———:—

Beginners' Course in Experimental Psychology.

Three hours a week, each semester.

Second Course in Experimental Psychology.

Three hours a week, second semester.

A Study of Apperception.

Two hours a week, first semester.

*Research Course in Experimental Psychology.

Six hours a week, throughout the year.

Genetic Psychology.

Two hours a week, first semester.

D. SPECIAL COURSES

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.— *Two hours a week, second semester.*

Philosophy of Religion.

Two hours a week, first semester.

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, second semester.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1902-03 to the philosophy of evolution.—*Two hours a week, first semester.*

Assistant Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

E. GRADUATE SEMINARY

The library of George S. Morris, late Professor of Philosophy in the University has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been removed to the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

Professors WENLEY and LLOYD, Assistant Professors REBEC and PILLSBURY.

Graduate Seminary.

The assignment of subjects is as follows: Professor WENLEY, Metaphysics, Ethics, Philosophy of Religion, and Ancient Philosophy; Professor LLOYD, History of Philosophy, Metaphysics, and Ethics; Assistant Professor REBEC, Logic, Æsthetics, and Ancient Philosophy; Assistant Professor PILLSBURY, General and Experimental Psychology.

THE SCIENCE AND ART OF TEACHING

FIRST SEMESTER

Professor PAYNE:—

History of Education, Ancient and Mediæval.

Recitations and lectures. Text-book: Compayré's History of Pedagogy. *Tu, W, Th*, at 3. Room 4, T. H.

Graduate Seminary.

This course is open to those students only who are qualified to pursue advanced pedagogical study. Subject: Spencer's *Education*. *W, F*, at 2. Room 4, T. H.

SECOND SEMESTER

History of Modern Education.

Recitations and lectures. Text-book: Compayré's *History of Pedagogy*. *Tu, W, Th*, at 3. Room 4, T. H.

Graduate Seminary.

This course is open to those students only who are qualified to pursue advanced pedagogical study. Subject: Herbart's *Pedagogy*. *M, F*, at 3. Room 4, T. H.

POLITICAL ECONOMY AND SOCIOLOGY

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and either "Problems in Political Economy or Social and Industrial Reform." [Latter course not given in 1902-1903.] For description see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduate as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as "Graduate Courses" are open only to graduate students or to undergraduates making a specialty of political economy in their senior year. Attention may also be called to the fact that the third year of the special course in Higher Commercial Education is a graduate year, and leads to the degree of Master of Arts.

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway trans-

portation in this country and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions. *Two hours a week, second semester.*

[Administration of Corporate and Public Industries.

This course undertakes an analysis of industrial organization primarily from the administrative point of view. It considers the history and social significance of rapid transit in cities, and of other quasi-public industries. It studies railway administration under public as well as private ownership, and makes a special investigation into the history, organization, and administration of the Post-office Department of this and other countries. Alternates with the preceding course. Not given in 1902-1903.—*Two hours a week, second semester.*]

Seminary in Finance: Local and State Taxation.

This course is devoted to an investigation of questions of local finance. The sources of information are the state and municipal documents pertaining to financial legislation and administration and the numerous monographs descriptive of local financial practice.—*Two hours a week, first semester.*

Seminary in Finance: Finances of the Federal Government.

This course is devoted to an investigation of some particular period in the financial history of the Federal Government. The chief source of information is the reports of the Secretary of the Treasury. Use will also be made of the debates in Congress, of histories and of pertinent monographs. The period studied during the current year will embrace the years 1802 to 1826.—*Two hours a week, second semester.*

Professor TAYLOR:—

Principles of Finance.

In this connection the word Finance is used in the technical rather than the popular sense. That is, it does not include Money, Banking, Stock Speculation, or any of the allied topics. It is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account

of expenditures,—their different kinds, the limits as to amount set by financial considerations, and so on. It then enters upon a discussion of the various methods of raising funds to meet these expenditures, giving to Taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out. Lectures and quiz.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the Media of exchanges, including Money and its various Credit Substitutes. This is followed by a study of the Natural Laws governing monetary phenomena, such as those which fix the Monetary Standard, those regulating the Movement and Distribution of Money, and so on. Next comes a sketch of Monetary History,—particularly that of the United States. Finally, six or eight lectures are given to the best methods of regulating monetary systems. Lectures and text-book.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking Instruments and Operations. This is followed by a study of banking Principles,—the natural laws which regulate the safety of banking, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the History of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States. Lectures and text-book.—*Two hours. Second semester.*

[History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book — Ingram or Cossa — is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor retains the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours. First semester. Omitted in 1902-03.]*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the Nature of Capital, the Origin of Interest, the Laws of Value, and so on. The work of the class hour includes the discussion of readings assigned to the class generally and of reports on readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor retains the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of Economic Theory; and so on.—*Two hours. Second semester.*

Assistant Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Historical references are freely used, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements, and other sociological questions of present interest.

The class is supplied with a list of about twenty-five topics, accompanied by references, and each student is required to choose

one of these topics and write an essay upon it.—*Four hours a week, second semester.*

Historical Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted somewhat as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to Course 21, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order* will be used, also Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field. The course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is intended for advanced students, expecting to enter the ministry or for some other reason especially interested in the church. The work consists of topical study and reports.—*One hour a week, first semester.*

Special Work with Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as is found practicable and expedient.

Assistant Professor JONES:—

The Resources and Extractive Industries of the United States.

Lectures and assigned readings.—*Three hours, first semester.*

A study of the natural and social resources of the United States and of the chief extractive industries to determine their location, present condition, and relations to each other.

The Manufactures of the United States.

Lectures and assigned readings.—*Three hours, second semester.*

The evolution, present location, and condition of our chief manufacturing industries will be presented, and the relations of these industries to one another, to sources of raw materials, transportation, and market facilities, and foreign trade.

The Distributive and Regulative Industries of the United States.

Lectures and assigned readings.—*Two hours, first semester.*

This course, which alternates with the following course, will include a description of the various methods of marketing goods, of the classifications, grades, brands, and trademarks employed, and of wholesale and retail trade, jobbing, etc. Attention will also be given to those private organizations, not connected with money and banking, which guide and control the industrial process, such as trade associations and trade papers, boards of trade and chambers of commerce, stock and produce exchanges, national and export associations, museums and expositions.

[Technique of Foreign Trade.

Two hours, first semester.

This course (not given in 1902-03) alternates with the preceding course. It treats of the supply and demand areas of the world, with special reference to the chief articles of international trade. It comprises a study of the documents, regulations, and customary procedure of foreign trade, including methods of selling goods in foreign countries, shipping routes, customary packages, weights and measures, tariffs, export bounties, commercial treaties, and foreign industrial legislation.]

European Commercial Geography.

Two hours, second semester.

Alternates with the following course. A presentation of the resources and industries of the chief European states, particular emphasis being laid upon openings for American trade.

[American Trade with China, Japan, and the Philippines.

Two hours, second semester.

This course (not given in 1902-03) alternates with the preceding course. It will include a statement of the resources and industries of the countries mentioned, and a consideration of the present and probable future trade of the United States with them.]

Dr. GLOVER:—

Theory of Annuities and Insurance.

Two hours a week.

This course will be a fairly detailed development of the theory of simple and compound interest and the theory of probability with their application to life insurance based upon tables of mortality. It is proposed to consider the following subjects, annuities, pure endowments, mortality tables, life insurance based on same, method of deducing net premiums, single, annual, and limited, endowment insurance, commutation tables, reserve surplus, loading, dividends, and various features pertaining to actuarial science. If time permits, the consideration of investment rates on funded stocks and bonds will be taken up.

INTERNATIONAL LAW

President ANGELL:—

FIRST SEMESTER

Lectures on International Law.

Tu, Th, at 2. Lecture Room, T. H.

Course 1 is open only to those who have completed two courses in history; Course 2 is especially recommended as one of the two.

SECOND SEMESTER

History of Treaties.

Tu, Th, at 2. Lecture Room, T. H.

Course 2 must be preceded by Course 1.

MATHEMATICS

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students. For further information see the special announcement of the departments of mathematics and physics.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

This course forms a direct continuation of the course in elementary mechanics; it is mainly devoted to the dynamics of a rigid body.—*Three hours a week, second semester.*

Assistant Professor MARKLEY:—

Projective Geometry and Modern Analytic Geometry.

Three hours a week, throughout the year.

Dr. GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots; resultants; solution of a system of n linear equations; theorems concerning integral functions of one and two variables; correspondence; linear transformation; invariants and covariants; symbolic forms.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Jordan's *Cours d'analyse*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Three hours a week, first semester.

Assistant Professor MARKLEY:—

Theory of Functions.

The first part of this course is devoted to functions of real variables; the second part to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometrical representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

Dr. GLOVER: —

Theory of Substitutions.

Two hours a week, throughout the year.

Theories of Annuities and Insurance.

Two hours a week. (This course is described under Political Economy and Sociology.)

PHYSICS

The courses announced below presuppose about one and a half year's collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, five hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for half a year.

The courses in Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART: —

Electrochemistry.

Three hours a week, first semester.

Alternate Current Phenomena.

Two hours a week, second semester.

Professor CARHART and Assistant Professor GUTHE: —

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a very thorough treatment of the subjects of capacity, inductance, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester*; *three times a week, second semester.*

Professor PATTERSON:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distributions, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three hours a week, first semester; two hours a week, second semester.*

Dynamo-Electric Machinery.

Lectures, *two hours a week*; laboratory work, *once or twice a week, second semester.*

Alternate Current Apparatus.

Lectures, *two hours a week*; laboratory work *once a week, first semester.*

The courses in Dynamo-Electric Machinery, Alternate Current Apparatus, and Alternate Current Phenomena form a graded series covering the theory of dynamo-electric machines, alternate current working, transformers, and alternate current phenomena as applied to generators, distribution of power, and induction motors. Laboratory work forms a part of the first two courses.

Professor REED:—

The Theory of Sound.

Lectures and laboratory work. The lectures are based upon the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—Lectures, *two hours a week*; laboratory work, *twice a week, first semester.*

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week, second semester.*

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester.*

Assistant Professor GUTHE:—

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations, *two hours a week, second semester.* This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of these principles to numerous problems in physics and chemistry.

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, first semester.*

CHEMISTRY

Resident graduates, registered under the provisions of Admission and Registration given on page 11, may enter upon any of the courses in chemistry in this University for which they are qualified. A full description of these studies can be obtained in the ANNOUNCEMENT OF COURSES IN CHEMISTRY, for 1902-03, issued separately. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to the following named undergraduate courses in this University (University Calendar for 1901-1902, pages 96 to 98: Courses 1 and 2, Courses 3 and 5, Course 7,—making in all about twenty-five hours of under-

graduate credit.* If chemistry be taken as a minor subject in work registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1 and 2, the opening courses in general chemistry.

Candidates for a doctor's degree, in addition to the requirements above specified, must have satisfied the committee in charge of their studies as to their fitness to enter upon the higher work. A reading knowledge of German and French is necessary.

Graduate students who are not in work for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one, in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for convenience of the readers. Chemical technology, metallurgy, sugar chemistry, phyto-chemistry, food analysis, pharmacy, and pharmacology, are provided for.

A. GENERAL AND PHYSICAL CHEMISTRY.

Professor FREER:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Chemical Literature; Journal Club.

The Journal Club discusses current chemical literature. It is under the direction of Professor FREER, but the professors, instructors, and assistants in the laboratory take part therein. All of the prominent journals are divided among the participants, who report on the most interesting topics in rotation.—*One hour to one and one-half hours a week, throughout the year.*

Laboratory Research.

The work may be either organic or inorganic, and the student is at liberty to select one from a number of topics proposed. The work includes the study of the literature bearing upon the topics. In order to accomplish results the student should have at least five clear half days a week to devote to the work. This state-

* An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during one semester.

ment applies to all research courses.—*Hours arranged with instructor, throughout the year.*

Dr. BIGELOW:—

Physical and Theoretical Chemistry.

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry. It must precede or accompany laboratory work in this subject. Lectures.—*Four hours a week, second semester.*

Physical and Theoretical Chemistry.

Advanced Course. Electro-Chemistry and selected topics. Lectures.—*Two hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Two courses cover, as far as possible, the ground outlined in the lectures. They include the standard methods of determining molecular weights, studies of solutions, dissociation, electro-chemistry, etc. The first course at least is essential for all who wish to become acquainted with modern chemistry.—*Hours arranged with instructor.*

Laboratory Research.

Physical Chemistry.—*Hours arranged with instructor.*

Mr. HIGLEY:—

Laboratory Work in Selected Topics of Inorganic Chemistry, including Inorganic Preparations.

This work is preparatory to research and is also especially intended for teachers.

Laboratory Research in Inorganic Chemistry.

Hours arranged with instructor.

Dr. HULETT:—

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and also includes a training in preparing demonstrations proper for use in teaching.—*Hours arranged with instructor, throughout the year.*

Laboratory Research, Including Work in the Determination of Atomic Weights.

Hours arranged with instructor, throughout the year.

Mr. LICHTY: —

Laboratory Work with the Polariscope and the Spectroscope.

This course includes the theory of the instruments, their practical applications, and the study of stereochemical questions involved.—*Hours arranged with instructor, second semester.*

B. ANALYTICAL CHEMISTRY AND ORGANIC CHEMISTRY.

Professor PRESCOTT: —

Seminary in Recent Research.

Library work upon chosen questions, discussions, and the writing of reviews.—*Two hours a week, throughout the year.*

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, in either first or second semester.*

Investigation in Organic or in Analytical Chemistry.

Laboratory and library research upon subjects selected, *throughout the year.*

Analytical Organic Chemistry, with Assistant Professor STEVENS or with Dr. DUNLAP: —

Laboratory courses with lectures upon the alkaloids, the fats, analysis of foods, and special subjects.—*Hours arranged with instructor, throughout the year; the lectures in the second semester.*

Professor JOHNSON: —

Qualitative Analytical Chemistry.

Following undergraduate Course 3 (University Calendar for 1901-1902, page 97) or its equivalent. Laboratory work and lectures.—*Lectures twice a week, second semester; laboratory work, including electrical methods, hours arranged with instructor.*

Professor CAMPBELL: —

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1901-1902, page 97) or its equivalent. Laboratory work directed

by lectures in any of three courses, namely: (1) Advanced quantitative methods in general, (2) the analysis of minerals, (3) iron and steel analysis. Electrolytic methods are much employed, and there is a room devoted to their use.—*Hours arranged with instructor, throughout the year.*

Investigation in Analytical Method, Inorganic Structure, and Metallurgical Chemistry.

Laboratory work upon questions related to researches published from this department. Use is made of Le Chatelier's pyrometer, as well as of calorimetric methods in study of heats of formation. Special work is given in micrometallography, as bearing upon the constitution of metals and their alloys.—*Hours arranged with instructor, throughout the year.*

Professor CAMPBELL and Mr. WHITE:—

Technical Methods and Investigations. Laboratory work as follows:—

- (1) Gas Analysis, Calorimetry, and Photometry.
- (2) Technical Examination of Gold and Silver Ores.
- (3) The Cement Industry, with special reference to influence of composition and temperature of burning.
- (4) Coal, gas, and by-products.
- (5) Influence of heat and mechanical treatment on constitution of iron and steel.
- (6) The chemistry of beet sugar, with special reference to its manufacture.

Other subjects may be chosen after consultation.—*Hours arranged with instructor, throughout the year. In (2) the work must begin in first semester.*

Assistant Professor SCHLOTTERBECK:—

Phytochemical Research.

The chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.—*Laboratory work, throughout the year.*

Assistant Professor GOMBERG:—

Lectures on the Benzene Derivatives.

Following undergraduate Course 7 (University Calendar for

1901-1902, p. 97) or its equivalent.— *Four hours a week, second semester.*

Organic Synthesis and Ultimate Analysis.

Laboratory work.— *Hours arranged with instructor, throughout the year.*

Investigation in Organic Chemistry.

Laboratory work upon subjects related to Dr. Gomberg's published researches.— *Hours arranged with instructor, throughout the year.*

Mr. WHITE:—

Chemical Technology.

Lectures on the main chemical industries, inorganic in the first semester, and organic in the second semester. Among the subjects treated are the alkali and acid industries, cements, wood and coal distillations, beet sugar, starch, glucose, paper, bleaching, dyeing, and tanning.— *Five hours a week, throughout the year.*

Dr. SULLIVAN:—

Investigation of Inorganic Reactions.

Laboratory and library research. The application of the methods of physical chemistry to analytical investigation. Apparatus for measurement of electrical conductivity and potential differences of solution, thermostats for determination of solubility, and the usual other facilities for work of this nature are provided.— *Hours arranged with instructor, throughout the year.*

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN:—

Original Research on the Causation of Disease.

The Study of the Chemistry of Bacterial Cells.— *Hours arranged with instructor, either first or second semester.*

Professor NOVY:—

Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of

blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus, and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1901-02, page 101.—*Hours arranged with instructor, either first or second semester.*

Advanced Physiological Chemistry.

Laboratory work and reading.—*Hours arranged with instructor, either first or second semester.*

Methods of Hygiene.

Chemical and bacteriological examination of water, air, soil, milk, butter, etc.—*Hours arranged with instructor, either first or second semester.*

ASTRONOMY

A knowledge of general astronomy and calculus is required for all courses. In the theoretical courses a careful training is given in those principles of exact astronomy which should be prerequisites for all investigations.

Professor HALL:—

Spherical Astronomy.

Transformation of co-ordinates, precession, nutation, aberration, determination of fundamental constants, and theory of instruments.—*Three hours a week, throughout the year.*

Theory of Least Squares.

Two hours a week, first semester.

Theory and Computation of Orbits.

Five hours a week, first semester.

Mathematical Theory of Planetary Motion.

Three hours a week, second semester.

Extended Practical Course.

Hours arranged with instructor, throughout the year.

NOTE.— The Observatory is provided with a 12¾-inch equatorial by Fitz, a 6 1-3-inch Pistor and Martins meridian circle, 6-inch Fauth equatorial, 3-inch meridian transit with zenith telescope, attachments, surveyor's transit, sextant, chronograph, and chronometers.

MINERALOGY

The higher work in mineralogy presupposes an acquaintance with general and analytical inorganic chemistry, and at least such knowledge of mineralogy as could be obtained from a course of study combining theoretical instruction with practice in determining minerals. The special character of the work in each case is determined after consultation with the applicant. The work is directed by Professor PETTEE.

GEOLOGY

The course of instruction in geology for undergraduates, as announced in the University Calendar for 1901-1902, pp. 104 and 105, embraces from two to three years' University work. The first year is devoted to elementary studies in physical geology, historical geology, and physical geography, giving three hours a week to each for one semester. Le Conte's Elements of Geology and Dana's Manual of Geology are used, supplemented by lectures and exhibitions of specimens, maps, etc. During the second year more detailed instruction is given, two hours each week, in the same general subjects. Green's Physical Geology is used for reference during the first semester, supplemented by lectures and laboratory work. Each student is given a special subject for investigation in connection with which a thesis of about 2,500 words is required. During the second semester palæontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student, and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary courses have been pursued. Those who have done more work than is represented by the elementary course may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of geology will be read with special reference to Pleistocene geology, and to the origin and classification of topographic forms, glacial records, lake histories, erosion, and all of the processes by which the surface of the earth has come to have its present form.

The geological museum is being arranged, and a series of fossils selected to illustrate the life history of North America. This collection is intended especially for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lectures will be returned to the cases in the museum where they will be available for examination at any time.

There is a second collection embracing some ten thousand specimens of both American and European fossils, which is arranged zoologically and intended for the use of advanced students in palæontology. Special collections of rocks, brachiopods, corals, etc., numbering from one hundred and fifty to two hundred specimens each, are arranged in the geological laboratory for the immediate use of students.

The collection in physical geology is small, but efforts are being made for its enlargement, and ample material will be on hand to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them in cases provided for the purpose, and facilities for consulting original monographs and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopes and photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

The work in geology is conducted by, or under the direction of, Professor RUSSELL.

ZOOLOGY

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given in the University Calendar for 1901-1902, page 35. A library shelved in the laboratory contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in the literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a *minor for the master's degree* will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctorate a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a *major for the doctor's degree* are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major will find it of advantage to select, as a *minor study*, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Vertebrate Zoology and Comparative Anatomy.

The work in this subject consists of three lectures and about twelve hours of laboratory work throughout the year. The forms studied in detail in the laboratory are the lancelet, the lamprey, skate, perch, turtle, bird, and cat. At the same time preparations of related forms are studied. The lectures are illustrated by many charts and preparations, made especially for the course, and by numerous lantern slides. It should be noted that the course *includes the work in mammalian anatomy* formerly announced as a separate course.—*Six hours a week, throughout the year.*

This course is given in 1901-1902, and in alternate years thereafter.

Comparative and Experimental Embryology (chiefly of Vertebrates).

The course consists of three lectures and about twelve hours of laboratory work throughout the year. During the first part of the course (until March 15), the laboratory work deals with the chick, and the lectures chiefly with organogeny. During the second part of the course living embryological material is used, and from all vertebrate classes. The work is then comparative and experimental, and deals with the lamprey, the dog-fish (*amia*) numerous bony fishes (*Stizostedion*, *Perca*, *Ameiurus*, *Catastomus*, etc.), numerous amphibia (*Rana*, *Bufo*, *Amblystoma*, etc.), all of which are available in abundance in this locality, in addition to the usual reptilian, avian, and mammalian material. Invertebrate material is also utilized to a considerable extent. It is the purpose of the second part of the course to develop the experimental side of embryology.—*Six hours, throughout the year.*

This course is omitted in 1901-1902, but will be given in alternate years thereafter.

Animal Behavior.

Two hours, second semester.

(See announcement of the same course under Dr. HOLMES, below.)

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or three hours, throughout the year.*

Assistant Professor JENNINGS:—

Physiological Zoology.

A course in the general physiology of animals, dealing with the *processes* occurring in living matter. The course is intended to lay the basis for an understanding of modern experimental work in biology and the theories based upon it, as well as to serve as an introduction to the courses in the special physiology of man. Lectures and laboratory work.—*Four hours, second semester.*

Teachers' Course: High School Zoology and Methods of Teaching It.

A study of the animals considered suitable for a high school course. Subjects are assigned to individual students, and they pre-

pare outlines for high school use. The work is accompanied by reading and conferences.— *One hour, second semester.*

Systematic Zoology: The Rotifers.

Students will work on the local fauna.— *Two or three hours, throughout the year.*

Dr. HOLMES:—

Invertebrate Zoology.

The structure, classification, habits, and distribution of invertebrate animals with special reference to the influence of environment, to adaptation, and to the general principles of organic evolution.— *Five times a week, first semester.*

Systematic Zoology: The Crustacea.

Students will work on the local fauna.— *Two or three hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates.

Assistant Professor JENNINGS:—

Investigations in experimental zoology; the reactions of animals to stimuli.

Dr. HOLMES:—

Investigations in

- a) Cytology.
- b) The behavior of animals.

The ZOOLOGICAL FACULTY:—

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although the meetings are open to all, the membership is restricted.— *One hour a week, throughout the year.*

ZOOLOGICAL CLUB.

This is a voluntary organization of zoological students. Field excursions are made at regular intervals, and occasional meetings

are held for discussions, lectures, and for other purposes. Members of the zoological staff are members of the club, and take part in its work. The zoological staff has further undertaken a systematic study of the local fauna. Instruction is offered in the subject (see under Systematic Zoology), and it is hoped thus to stimulate field work.— *Throughout the year.*

BOTANY

The work in botany in this University is divisible into morphology, physiology, and classification. For the study of each of these divisions there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. A plant garden on the campus, adjacent plant houses, and woods, fields, swamps, and waters in the vicinity furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to preparation and needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctorate, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found on pages 8–11 of this Announcement.

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below, nearly all of which consist largely of laboratory work.

Professor SPALDING:—

Ecology and Distribution.

Habits, adaptation, and societies of plants. The vegetation of glacial lakes, sphagnum swamps, and the Huron River in the vicinity of Ann Arbor, afford part of the material and topics for this course. Lectures, with field work and reports. *Two or more hours a week, first semester.*

The Natural Families of Plants.

A review of the leading groups of plants with primary reference to relationship, distribution, and biological characters. Lectures, with reading and demonstrations.—*Two or more hours a week.*

Teachers' Course.

Conferences and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations.—*One hour a week, second semester.*

Professor NEWCOMBE:—

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more hours a week, throughout the year.*

Dr. POLLOCK:—

Reproduction and Embryology of Flowering Plants.

A study of the development of pollen and the embryo sac; fertilization; alternation of generations: embryology. Lectures and laboratory work.—*Three hours a week, second semester.*

A study of the influence of environment and the factors in the development of the forms of plants. The material used for experiment is supplied mostly from flowering plants. Lectures and laboratory work.—*Two or more hours a week, throughout the year.*

Morphology and Physiology of Fungi.

In this course special attention is given to the identification of fungi, their habits of growth and reproduction, and their relation

to plant and animal diseases. Lectures and laboratory work.—
Five hours a week, throughout the year.

Professor SPALDING: —

Investigations in Ecology and Distribution.

The relation of higher plants to their environment.

Professor NEWCOMBE: —

Investigations in Physiology.

Plant nutrition, growth, irritability, and reproduction.

Investigations in Cytology.

Cell division and cell physiology.

THE DEPARTMENTAL STAFF: —

Journal Club.

A fortnightly meeting of the laboratory staff, and advanced students for the review and discussion of current botanical literature.

FORESTRY

The Board of Regents provided for instruction in Forestry by establishing, in June, 1901, a Department of Forestry. Pending the completion of the organization of the Department, the following preliminary announcement is made for the information of those who may wish to enter upon the study of this subject.

Forestry is based upon the application of a thorough knowledge of a number of not closely related pure sciences, among which are Botany, Zoology, Geology, Physical Science, and Mathematics, and an amount of time equal to that spent in obtaining the bachelor's degree should be given to the fundamental work of preparation for technical courses in Forestry by those who intend to make the subject a profession.

To insure this thorough ground work, the technical courses in Forestry are regularly open only to those students who have already received a bachelor's degree from this University, or from some college or university giving the degree for an equivalent amount of work. Moreover, the character and sequence of the preliminary work are regarded of so much importance that prospective forestry students are recommended to consult the head of the department of Forestry for direction and advice as early as possible in their undergraduate

work, in order to insure proper preparation in the least time, for the graduate courses.

For students having the requisite qualifications, the following courses are offered in Forestry for the year 1902-1903. These courses are all required of students who expect to complete a full technical course, and must be supplemented by other work as prescribed. It is expected that the courses announced will be added to for the year 1903-1904 by sufficient amount to make an additional year of technical work, at least one term of which will be devoted to practical studies in the woods.

All courses in Forestry, except Course I, are open only to graduate students expecting to make Forestry a profession.

Mr. C. A. DAVIS:—

Introduction to Forestry.

A synoptical preview of the science, intended to show the importance and comprehensiveness of Forestry. Lectures.—*Three hours, first semester.*

Silviculture.

The laws controlling the development of trees and forests, and their application in methods of improving, treating, and reproducing forest crops. Lectures and field work.—*Four hours, second semester.*

Dendrology.

Study of trees and shrubs, their structure, development, relationships, names, distribution, and uses. Lectures, laboratory, and field work.—*Three hours, each semester.*

Forest Mensuration.

The methods of finding the volume of felled and standing trees and of whole forests, of determining the rate of increase in height, diameter, and volume of individual trees and of stands, and of estimating timber. Lectures, recitations, and practical work.—*Three hours, each semester.*

ANATOMY AND HISTOLOGY

Dr. McMURRICH and Dr. HUBER:—

I. Anatomy of the Central Nervous System.

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have

taken Anatomy Course 4 or an equivalent.—*First or Second Semester, three hours.*

2. Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in Histology.—*Hours to be arranged with the instructor throughout the year.*

3. Anatomical Research.

4. Histological Research.

These courses are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors throughout the year.*

PHYSIOLOGY

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a *minor for the master's degree* is five hours of lectures the first semester, three hours the second semester, a laboratory course of five afternoons a week for eight weeks, the second semester, and a report on the literature of some limited subject. No research work will be required, except from those who have already taken advanced work in physiology. The requirements for a *major for the master's degree* includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirement for a *minor for the doctor's degree* involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a *major for the doctor's degree* is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, biology, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research, under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; three hours a week, second semester.

Laboratory Course.

Five afternoons a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

Catalogue of Students 1901-1902*

RESIDENT GRADUATES

NAMES	RESIDENCE
Royal Albert Abbott, Ph.B., <i>Ohio State University</i> , 1900, Rhetoric; English Literature; Aesthetics.	<i>Columbus, O.</i>
Paul Agnew, B.L., <i>Hillsdale College</i> , 1901, Astronomy; Mathematics; Physics.	<i>Hillsdale.</i>
Kakujiro Akamatsu, A.B., 1901, Finance; Political Economy; History.	<i>Tokyo, Japan.</i>
Leila Ruth Albright, A.B., <i>Vassar College</i> , 1901, American History; English Literature; Latin.	<i>Detroit.</i>
Robert Earle Anthony, A.B., <i>Southwestern Baptist Univ.</i> , 1901, Latin; Greek; Roman Political Institutions.	<i>Orysa, Tenn.</i>
Henry Herbert Armstrong, A.B., 1901, Latin; Greek; Roman Archaeology.	<i>Ann Arbor.</i>
Lois LeBaron Avery, B.L., 1898, Rhetoric; American History; English Literature.	<i>Ann Arbor.</i>
Ellen Botsford Bach, A.B., 1901, Botany; Vertebrate Zoology; Invertebrate Zoology.	<i>Ann Arbor.</i>
Samuel Bauman, B.L., <i>German Wallace College</i> , 1899, German; English Literature; Rhetoric.	<i>Henrietta, O.</i>
John Watson Beach, A.B., 1896, Latin; Greek; General Linguistics.	<i>Lexington.</i>
Mary Ella Bennett, Ph.B., 1895, Botany; Plant Physiology; Invertebrate Zoology.	<i>Ann Arbor.</i>

*The principal subjects of study pursued by candidates for an advanced degree are indicated under their respective names; the subject first named being the major study.

A dagger (†) indicates that the student was admitted to the Graduate School at the beginning of the second semester, on completion of the requirements for the bachelor's degree, though the degree was not to be conferred until the end of the year.

- John Knight Munro Berry, A.B., 1901, *Cedar Rapids, Ia.*
German; Latin; Roman Political Antiquities.
- Harriet Williams Bigelow, A.B., *Smith College*,
1893, *Utica, N. Y.*
Practical Astronomy; Theoretical Astronomy; Physics.
- Wilbur Pardon Bowen, B.S., 1900, M.S., 1901, *Ann Arbor.*
Physiology; Physiological Chemistry; Vertebrate Histology.
- Harold Prell Breitenbach, A.B., 1901, *Detroit.*
English Literature; Latin; Greek.
- Edwin Newton Brown, A.B., 1883, A.M., 1884,
LL.B., 1887, *Ann Arbor.*
Pedagogy; History of Philosophy; Psychology.
- Mary Louise Bunker, Ph.B., 1899, *Ann Arbor.*
- Kenyon Leech Butterfield, B.S., *Mich. Agr. Coll.*
1891, *Ann Arbor.*
Political Economy; Sociology; History of Education.
- Charles Beed Clark, A.B., 1901, *Ann Arbor.*
Sociology; American History; European History.
- Alvin Nelson Cody, B.S., *Albion College*, 1901, *Mayville.*
Botany; Plant Physiology; Pedagogy.
- Allen Lysander Colton, Ph.B., 1889, A.B., 1890,
A.M., 1898, *Ann Arbor.*
- Albert Robinson Crittenden, A.B., 1894, *Frankfort.*
Latin; Greek; Roman Political Institutions.
- Charles Edward Cullen, A.B., 1901, *Chicago, Ill.*
Latin; Roman Political Institutions; English Literature.
- David D. Culler, Ph.B., *DePauw University*, 1896, *Smithville, O.*
English Literature; German; Pedagogy.
- Caroline Elizabeth DeGreene, Ph.B., *Earlham Col-*
lege, 1893, *Ann Arbor.*
German Literature; Germanic Philology; French Literature.
- Andrew Jackson Detweiler, A.B., *Univ. of the*
State of Mo., 1896, M.D., 1900, *Washington, Mo.*
Bacteriology; Physiological Chemistry; Sanitary Science.
- Maud Mary DeWitt, B.S., 1900, *Ann Arbor.*
Zoology; Embryology; Botany.
- Nina May Doty, Ph.B., 1896, *Ann Arbor.*
German; English Literature; French.
- Joseph William Tell Duvel, B.S., *Ohio State Uni-*
versity, 1897, *Holder of the Dexter M. Ferry*
Botanical Fellowship, *Wapakoneta, O.*
Botany; Vegetable Physiology; Organic Chemistry.
- Alpha Caroline Edmand, A.B., 1901, *Pella, Ia.*
American History; European History; English Literature.
- Andrew Miller Fairlie, A.B., *Harvard University*,
1900, *Jacksonville, Fla.*
Organic Chemistry; Pharmacognosy; Analytical Chemistry.

- Herbert Louis Ferrand, A.B., 1901, *South Grand Rapids.*
French; German; Rhetoric.
- Clarence James Foreman, B.S., *Mich. Agr. Coll.*,
1894, M.S., *ibid.*, 1896, A.M., 1901, *Harbor Springs.*
- Victor Emmanuel François, *University of Brussels*, *Ann Arbor.*
Old French; Spanish; Latin.
- Colman Dudley Frank, Ph.B., 1897, *Toledo, O.*
French; German; Spanish.
- Fred Fullerton, B.S., *Alma College*, 1896, M.S.,
ibid., 1897, *Alma.*
Theoretical Astronomy; Practical Astronomy; Mathematics.
- Maurice Garland Fulton, Ph.B., *Univ. of Miss.*,
1898, A.M., *ibid.*, 1901, *Holder of the Pilgrim*
Fellowship in Rhetoric and English Compo-
sition, *University, Miss.*
Rhetoric; English Literature; Aesthetics.
- Louis Merwin Gelston, A.B., 1901, *Ann Arbor.*
Bacteriology; Organic Chemistry; Sanitary Science.
- Ida Augusta Green, Ph.B., *Oberlin College*, 1890, *Brookland, D. C.*
American History; English Literature; Sociology.
- Walter David Hadzsits, A.B., 1898, A.M., 1899,
Holder of the Buhl Classical Fellowship, *Detroit.*
Latin; Greek; Philosophy.
- Leonard Dixon Haigh, B.S., 1900, *Port Huron.*
Organic Chemistry; Analytical Chemistry; Physics.
- Victor Dean Hawkins, B.S., *Olivet College*, 1899, *Vermontville.*
Physics; Mathematics; General Chemistry.
- Edwin Andrew Hayden, B.S., *University of*
Wisconsin, 1894, *Union City.*
- Florence Hedges, A.B., 1901, *Lansing.*
Botany; Plant Physiology; Zoology.
- George Oswin Higley, A.B., 1891, M.S., 1893, *Ann Arbor.*
Inorganic Chemistry; Physics; Mineralogy.
- Arthur Joseph Hoare, A.B., 1900, *Elk Rapids.*
Latin; Mathematics; Pedagogy.
- William Josephus Hocking, B.L., *University of*
Wisconsin, 1896, M.L., *ibid.*, 1900, *Darlington, Wis.*
American History; European History; Economics.
- Lemuel Guy Holbrook, Ph.B., 1900, *Saint Johns.*
Physics; Mathematical Physics; Mathematics.
- Roy Temple House, A.B., *Miami University*, 1900, *Oxford, O.*
French; Spanish; English Philology.
- Harrison Estelle Howe, B.S., *Earlham College*,
1901, *Richmond, Ind.*
- Irving Benjamin Hunter, A.B., 1901, *Ypsilanti.*
Latin; Greek; Roman Political Antiquities.
- Mary Olive Hunting, A.B., *Alma College*, 1893, *Marshall.*
Latin; Greek; Roman Political Antiquities.

- Clara Octavia Jamieson, A.B., 1901, *Ann Arbor.*
Experimental Zoology; Invertebrate Morphology; Botany.
- Jessie Gertrude Jennings, A.B., 1901, *Troy.*
Latin; Greek; German.
- Linus Edwin Kimmel, Ph.B., 1898, *Coldwater.*
- Elsa King, B.L., 1899, *Ann Arbor.*
American History; European History; Rhetoric.
- Harry Edwin King, B.L., 1891, *Ann Arbor.*
History; International Law; Political Institutions.
- Mary Rebecca Langsdale, A.B., *DePauw University*, 1888, *Indianapolis, Ind.*
English Literature; American History; Rhetoric.
- Adelbert Eugene Lathers, B.L., 1900, *Ann Arbor.*
- Mary Frances Leach, B.S., 1893, *Fellow in Physiological Chemistry*, *Detroit.*
- Otto Charles Marckwardt, A.B., 1901, *Grand Rapids.*
German Literature; English Literature; Rhetoric.
- Felicitas Mareck, B.L., *University of Minnesota*, 1900, *Minneapolis, Minn.*
English Philology; German; Scandinavian.
- Charles Edward Marshall, Ph.B., 1895, *Agricultural College.*
Bacteriology; Hygiene; Organic Chemistry.
- Yoshinaga Mikami, *Keio College*, 1897, *Kofu, Japan.*
Political Economy; History; International Law.
- Clarence Burton Morrill, B.L., 1900, *Ann Arbor.*
English Literature; Rhetoric; Aesthetics.
- Flora Estelle Parker, B.L., 1899, *Detroit.*
American History; European History; Political Economy.
- John Castelar Parker, B.S., 1901, *Detroit.*
Physics; Mathematics; Applied Mechanics.
- Raymond Pearl, A.B., *Dartmouth College*, 1899, *Ann Arbor.*
Zoology; Plant Physiology; Psychology.
- Claude Francis Peck, A.B., *Albion College*, 1900, *Grand Rapids.*
Analytical Chemistry; Chemical Technology; Organic Chemistry.
- Oliver Winfred Perrin, A.B., 1901, *Ypsilanti.*
English Literature; Rhetoric; Mathematics.
- Harlow Stafford Person, Ph.B., 1899, A.M., 1900, *Lansing.*
Economic Geography; Economic Theory; Sociology.
- Julia Magruder Phillips, A.B., 1901, *Leavenworth, Kan.*
Political Economy; Sociology; English Philology.
- Mary Plant, A.B., 1901, *Minneapolis, Minn.*
Rhetoric; German; Aesthetics.
- Raymond Haines Pond, B.S., *Kansas Agr. Coll.*, 1898, M.S., *ibid.*, 1899, *Ann Arbor.*
Botany; Plant Physiology; Organic Chemistry.
- Mary Burnham Putnam, Ph.B., 1885, *Ypsilanti.*
- Lindley Pyle, A.B., 1901, *Kennett Square, Pa.*
Physics; Mathematics; General Chemistry.

- Thomas Ernest Rankin, A.B., 1898, *Ann Arbor.*
Rhetoric; Aesthetics; English Literature.
- Anna Louise Rhodes, A.B., 1901, *Ada.*
Botany; Plant Physiology; Invertebrate Zoology.¹
- William Rinck, A.B., *Hope College*, 1900, A.B.,
1901, *Holland.*
- Helen May St. John, Ph.B., 1899, *Ann Arbor.*
Rhetoric; American History; American Literature.
- Daniel Cornelius Schaffner, A.B., *College of Em-*
poria, 1898, A.M., 1901, *Morganville, Kan.*
Zoology; Physiological Zoology; Geology.
- Ida Marie Schaible, A.B., 1901, *Ann Arbor.*
German; French; English Literature.
- John William Scholl, A.B., 1901, *Chattanooga, Tenn.*
German Literature; German Philology; French.
- Marvin Manam Sherrick, A.B., *Coe College*, 1896, *Muncie, Ind.*
German; English Philology; Pedagogy.
- Hanji Shimotome, *Tokyo Polytechnic Institute*,
1895, *Tokyo, Japan.*
Organic Chemistry; Chemical Technology; Analytical Chemistry.
- Flora Ann Sigel, Ph.B., 1898, *Hamburg, N. Y.*
American History; European History; English Literature.
- Mabel Alice Steward, A.B., *Bates College*, 1895, *Birmingham.*
English Philology; German; English Literature.
- Magdalena Stuke, A.B., 1901, *Bryan, O.*
German; Latin; Roman Political Institutions.
- Frederick Tyndall Swan, A.B., 1897, A.M., 1898, *Potsdam, N. Y.*
Latin; Greek; Roman Political Antiquities.
- Alfred Henry Syverson, A.B., 1901, *Lead, S. Dak.*
Latin; Greek; Roman Constitutional Law.
- Joseph Morris Thomas, Ph.B., 1898, *Ann Arbor.*
English Literature; Rhetoric; Aesthetics.
- Mary Courtland Vanderbeek, A.B., *Smith College*,
1893, *Englewood, N. J.*
Latin; Pedagogy; Roman Political Antiquities.
- Elizabeth May Vickers, A.B., *Univ. of Kansas*,
1899, *Paola, Kan.*
Rhetoric; Anglo-Saxon; General Linguistics.
- Sylvia Sanders Videtto, Ph.B., 1900, *Ann Arbor.*
English Literature; German Literature; French Literature.
- George Wagner, Ph.C., 1893, A.B., *Univ. of Kan-*
sas, 1899, *Lawrence, Kan.*
Zoology; Plant Physiology; Psychology.
- Lawrence Root Waldron, B.S., *North Dakota*
Agr. Coll., 1899, *Ionia.*
Zoology; Embryology; Botany.
- Agnes Wegener, A.B., *Northwestern University*,
1901, *Evanston, Ill.*
Mathematics; German; Physics.

- Lewis Hart Weld, A.B., *University of Rochester*,
1900, *Medina, N. Y.*
Zoology; Plant Morphology; Plant Physiology.
- May Wheeler, A.B., 1901, *Indianapolis, Ind.*
Physiological Chemistry; Bacteriology; Sanitary Science.
- Mary Bessie Wiley, A.B., *Antioch College*, 1897, *Yellow Springs, O.*
English Literature; Latin; Pedagogy.
- Vernor Justin Willey, B.S., *Mich. Agr. Coll.*, 1893, *Ann Arbor.*
Physics; General Chemistry; Mathematics.
- Andrew Hollister Wood, Ph.B., 1900, *Ann Arbor.*
American History; Political Economy; European History.
- Frank Otis Woodruff, Ph.B., *Brown University*,
1899, A.M., *Tabor College*, 1900, *Needham, Mass.*
General Chemistry; Analytical Chemistry; Organic Chemistry.
- Jane E. Work, B.L., 1895, *Lancaster, O.*
English Literature; American Literature; German.
- Theophil John Zimmerman, A.B., 1901, *Holder of
the Peter White Fellowship in American
History*, *Lansing.*
American History; European History; Sociology.

-
- †Julius Earle Barton, A.B., 1902, *Detroit.*
- †Ernest Sutherland Bates, A.B., 1902, *Cleveland, O.*
Rhetoric; Aesthetics; English Literature.
- †Anna Katherine Hutchenreuther, A.B., 1902, *West Bay City.*
German; Latin Literature; Latin Philology.
- †Harry Augustus Weston, A.B., 1902, *Waterliet.*
American History; European History; Philosophy.
- †Jacob Howard Merton Wiest, A.B., 1902, *Pontiac.*
Greek Philosophy; Greek; Latin.

CANDIDATES FOR A MASTER'S DEGREE STUDYING IN ABSENTIA

- Winifred Campbell Daboll, A.B., 1900, *Saint Johns.*
Latin; Roman Antiquities; English Literature.
- Charles William Mickens, B.L., 1899, *Moorhead, Minn.*
American History; English Literature; Pedagogy.

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April 1, 1903.

UNIV OF MICH

APR 23 1903

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

GRADUATE SCHOOL

ANNUAL ANNOUNCEMENT

FOR

1903-1904

ANN ARBOR
PUBLISHED BY THE UNIVERSITY
1903

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

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CALENDAR.

1903.

- Sept. 29.** **FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY.**
- Nov. —** **Thanksgiving Recess of three days, beginning Tuesday evening, in all Departments of the University.**
- Dec. 18.** **(Evening) Holiday Vacation begins in all Departments.**

1904.

- Jan. 5.** **Exercises resumed.**
- Feb. 12.** **(Evening) FIRST SEMESTER CLOSES.**
- Feb. 15.** **SECOND SEMESTER BEGINS.**
- April 15.** **(Evening) Recess begins, ending April 25 (evening).**
- June 23.** **COMMENCEMENT IN ALL DEPARTMENTS OF THE UNIVERSITY.**

ADMINISTRATIVE COUNCIL.

JAMES B. ANGELL, LL.D., *President.*

ALBERT B. PRESCOTT, M.D., LL.D., *Director of the Chemical Laboratory, and Professor of Organic Chemistry.*

REV. MARTIN L. D'OOGHE, LL.D., *Professor of the Greek Language and Literature.*

WILLIAM H. PETTEE, A.M., *Professor of Mineralogy, Economic Geology, and Mining Engineering.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

ALBERT H. PATTENGILL, A.M., *Professor of Greek.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory.*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory.*

*VOLNEY M. SPALDING, PH.D., *Professor of Botany.*

HENRY C. ADAMS, LL. D., *Professor of Political Economy and Finance.*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts.*

ALBERT A. STANLEY, A.M., *Professor of Music.*

FRANCIS W. KELSEY, PH.D., *Professor of the Latin Language and Literature.*

OTIS C. JOHNSON, PH.C., A.M., *Professor of Applied Chemistry.*

PAUL C. FREER, PH.D., M.D., *Professor of General Chemistry and Director of the Laboratory of General Chemistry.*

*ANDREW C. McLAUGHLIN, A.M., LL.B., *Professor of American History.*

ASAPH HALL, JR., PH.D., *Professor of Astronomy and Director of the Observatory.*

ISRAEL C. RUSSELL, C.E., LL.D., *Professor of Geology.*

WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology.*

JACOB REIGHARD, PH.B., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum.*

*Absent on leave.

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory.*

JAMES A. CRAIG, PH.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek.*

J. PLAYFAIR McMURRICH, PH.D., *Professor of Anatomy.*

ROBERT M. WENLEY, Sc.D., LL.D., *Professor of Philosophy.*

GEORGE HEMPL, PH.D., *Professor of English Philology and General Linguistics.*

ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages.*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching.*

FRED N. SCOTT, PH.D., *Professor of Rhetoric.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

FREDERICK G. NOVY, Sc.D., M.D., *Professor of Bacteriology.*

EDWARD D. CAMPBELL, B.S., *Professor of Analytical Chemistry.*

ALLEN S. WHITNEY, A.B., *Professor of Pedagogy.*

FILIBERT ROTH, B.S., *Professor of Forestry.*

FRED M. TAYLOR, PH.D., *Junior Professor of Political Economy and Finance.*

ALEXANDER ZIWET, C.E., *Junior Professor of Mathematics.*

GEORGE W. PATTERSON, JR., PH.D., *Junior Professor of Electrical Engineering.*

FREDERICK C. NEWCOMBE, PH.D., *Junior Professor of Botany.*

G. CARL HUBER, M.D., *Junior Professor of Anatomy.*

JOHN O. REED, PH.D., *Junior Professor of Physics.*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy, and Secretary of the Administrative Council.*

JOSEPH H. DRAKE, PH.D., LL.B., *Junior Professor of Latin and Roman Law.*

MORITZ LEVI, A.B., *Junior Professor of French.*

EARL W. DOW, A.B., *Junior Professor of History.*

MOSES GOMBERG, Sc.D., *Junior Professor of Organic Chemistry.*

WALTER DENNISON, PH.D., *Junior Professor of Latin.*

JOSEPH L. MARKLEY, PH.D., *Assistant Professor of Mathematics.*

CHARLES H. COOLEY, PH.D., *Assistant Professor of Sociology.*

S. LAWRENCE BIGELOW, PH.D., *Assistant Professor of General Chemistry.*

ANNOUNCEMENT OF THE GRADUATE SCHOOL.

GENERAL INFORMATION.

The University of Michigan.

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental Announcement. In the several faculties there were in 1902-1903, 170 officers of instruction, besides numerous assistants, some of whom participated in the work of teaching. Including the Summer Schools, about 3,800 students, representing 51 States and Territories, and 23 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts.

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1902-1903, 107 regular teachers and 36 assistants. The students in attendance numbered over 1,400, of whom 98 were graduates. The presence of such a number of graduate students, taken with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Libraries.

The various libraries of the University contain about 165,000 volumes, and include a number of important special collections. Among these are the McMillan Shakespeare Library, 5,082 volumes; the Parsons Library (political science), 4,325 volumes; the Goethe

Library of about 1,014 volumes; and the Morris Library (philosophy), 1,100 volumes. The general reading room seats 210 readers and separate rooms are provided for advanced students to work in, with the necessary books close at hand. Under certain restrictions graduate students have access to the book rooms. The library takes 1,000 periodicals, and is open, in term time, fourteen hours daily, except on Sundays and legal holidays. During the summer vacation it is open nine hours a day during the summer session, and six hours a day for the remainder of the time.

The Laboratories.

The University has an observatory and a large number of laboratories more or less fully equipped for routine instruction and for original research. The laboratories (omitting those connected exclusively with the work of the Engineering, Medical, and Dental Schools) are: the Anatomical, Botanical, Chemical, Geological, Histological, Hygienic, Physical, Physiological, Psychological, and Zoological. For a fuller account of them and their various resources, as also of the University collections for the study of art, archæology, ethnology, mineralogy, palæontology, systematic zoology, etc., consult the annual Calendar, which may be had *gratis* on application to Mr. James H. Wade, Secretary of the University.

Societies.

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc.

ORGANIZATION OF GRADUATE WORK.

The Graduate School.

The Graduate School was organized in the Spring of 1892 in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department—courses that have developed during the past few years from the continual extension of the elective system,—and to recognize and announce them as something distinct from the work of an ordinary college course. It aims

to make provision for a more systematic and efficient administration of the higher work, and, so far as possible, for the separate instruction of graduate students. It also aims to lay foundations for the future development of university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council, of which the President of the University is chairman.

The regulations of the University respecting graduate work that were formerly in force, have been modified in a few particulars by the Council, and it is possible that still further changes may be made in the year to come. The more important of these regulations are explained in the pages that follow.

The University System.

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of an original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a *master's* degree. It may be added also that for the *master's* degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Graduate students who do not wish to work for a higher degree are admitted to any course offered in the Department of Literature, Science, and the Arts, upon satisfying the professor in charge that they are qualified to pursue the work to advantage.

THE HIGHER DEGREES.

Degrees Conferred.

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees.

A Bachelor of this University, or of any other reputable university or college, may become a candidate for a master's degree, and may be recommended for the degree after one year's residence at the University, provided he pass a satisfactory examination on the course of study approved by the Administrative Council. A thesis may, or may not, be included in the requirements for a degree, as the committee in charge of the student's work may determine.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The practice of allowing graduates of this University to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.*

A student properly qualified may be permitted to pursue at the same time studies for a master's degree and studies in any of the professional schools, on condition that the term of study and residence in the Graduate School be extended to cover at least two years.

The Doctors' Degrees.

1. The doctor's degrees are open to all persons who have received a bachelor's degree, but no student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research. The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Doctor of Science.

2. It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study, and no definite term of required residence can be specified. As a rule, three years of graduate study will be necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened

in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work.

3. No student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. [This rule may be waived in the case of those who come properly accredited from a Graduate School of some other university, and of those who, as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.]

4. A student wishing to become a candidate for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

5. A candidate for a doctor's degree must take a major study that is substantially co-extensive with some one department of instruction in the University. He must also take two minor studies, one of which may be in the same department as the major, but involving a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council.

6. **THE THESIS.**—The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but it must depend for acceptance more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

Special Regulations Relating to the Higher Degrees.

1. Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within one week after the opening of the semester*, the particular branches of study to which they wish to give special attention.* The supervision of their work will then be entrusted to the proper committee.

2. The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

*See also next page under "Admission and Registration"

3. The thesis must be completed and put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

4. The thesis must be prepared for close scrutiny with reference not only to its technical merits, but also to its merits as a specimen of literary workmanship. It must be preceded by an analytical table of contents, and a carefully prepared account of the authorities used.

5. The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

6. Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of his thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. He is also required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities;—provided, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee. To guarantee the printing of the thesis, every candidate for the doctor's degree is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended.

ADMISSION AND REGISTRATION.

All applicants for admission to the Graduate School must first report to the Dean of the Department of Literature, Science, and the Arts, and present their credentials. They will then receive special blanks to be filled out, subject to the approval of the professors under whom they wish to work, and they should consult with these professors at once, in order, if possible, to report to the Secretary of the Administrative Council not later than one week after the opening of the semester.

The privileges of the school are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Admin-

istrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School.

Graduates of institutions where the undergraduate courses of study are not substantially equivalent to the course prescribed at this University, are ordinarily required to do an additional amount of undergraduate work, or to prolong their term of residence, before being admitted to full candidacy for a higher degree.

Graduates of this University, or of other institutions, who do not wish to become candidates for a degree, may be admitted and registered as special resident graduates.

Graduates of other institutions who are candidates for a bachelor's degree in the Department of Literature, Science, and the Arts, are not registered in the Graduate School.

FEES AND EXPENSES.

Matriculation Fee.—Every student, before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or graduate shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for the materials and apparatus actually consumed by them. The deposits required in advance are different in the different courses, ranging from one to twenty dollars. The laboratory expenses of students will vary with their prudence and economy. Experience has shown that in the chemical laboratory the average expense for all courses is about one dollar and twenty cents a week.

Diploma Fee.—The fee for the diploma given on graduation is ten dollars, and the by-laws of the Board of Regents prescribe that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

FELLOWSHIPS.

Elisha Jones Classical Fellowship.

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University, in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President ANGELL and Professors D'OOGHE, KELSEY, HUDSON, and PATTENGILL. The period of incumbency is limited to two academic years, and must be spent at this University "unless at any time the examining board shall see fit to allow the second year to be spent" at some other place favorable to classical study.

Fellowship in Chemistry.

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1902-1903 of the Fellowship in Chemistry established by them in 1895. Professors VAUGHAN, PRESCOTT, and FREER were designated to act as a committee to select the incumbent and to arrange the work in accordance with the wishes of the donors. The holder of the Fellowship for the year 1902-1903, is Herbert William Emerson, Ph.C., B.S.

Peter White Fellowship.

Provision for a Fellowship in American History for the year 1902-1903, with an income of four hundred dollars, was made by Honorable Peter White, of Marquette. The holder of the Fellowship for the year has been Frank Arthur Bohn, A.M.

Dexter M. Ferry Botanical Fellowship.

Provision for a Fellowship in Botany for the year 1901-1902, with an income of five hundred dollars, was made by Mr. Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year has been Edgar Nelson Transeau, A.B.

Stearns Fellowship.

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars.

Gas Engineering Fellowship.

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of a Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for special apparatus and material required for the research. The holder of the Fellowship for the year has been Max Emil Mueller, A.B.

The Nelson-Baker Fellowship.

A Fellowship of Chemistry and Pharmacology is maintained for investigation, by Messrs. Nelson, Baker and Company, of Detroit, dating from 1900, with an annual income of five hundred dollars. For 1902-03 the holder has been Lemuel William Famulener, Ph.C.

Buhl Classical Fellowship.

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a classical fellowship for the year 1902-1903. The holder of the fellowship for the year has been Charles Rufus Morey, A.M.

Fellowship in Music.

By the generosity of Mr. Frederick Stearns, of Detroit, provision was made for a Fellowship in Music for the year 1902-1903, with an income of four hundred dollars. The holder of this fellowship for the year has been Philip Louis Schenk, A.B.

Pilgrim Fellowship in Rhetoric and English Composition.

Provision for a Fellowship in Rhetoric and English Composition has been made for the past two years by the Pilgrim Publishing Company, of Battle Creek. Its purpose is to further original research in rhetoric and to encourage thorough preparation for the teaching of English Composition. The present holder of the fellowship is Miss Mary Lowell, A.B.

Rockefeller Scholarships

The Rockefeller Institute for Medical Research made a grant for two scholarships in Hygiene and Bacteriology for the year 1901-1902, and continued the grant for 1902-1903. The holders of these scholarships for 1902-3 have been Miss May Wheeler, A.B., and David J. Levy.

COURSES OF INSTRUCTION.

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates. Different departments of instruction have adopted different modes of announcing their work. For further information reference may be made directly to the head of the department concerned.

GREEK.

The courses here announced presuppose, in general, four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Lysias, Xenophon, Homer, Demosthenes, the Tragic Poets, and Aristophanes.

FIRST SEMESTER.

Professor D'Ooge:—

Teachers' Course.

Lectures on Greek Grammar, particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek. *Two hours a week.*

Seminary in Tragedy.

Studies in Sophocles, with special reference to the dramatic art of the poet, his use of meters and the antiquities of the Greek stage. *Three hours a week.*

[The Oresteian Trilogy in Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet. *Three hours a week.*

Omitted in 1903-1904; to be given in 1904-1905.]

The History of Greek Art from the Beginning to the Roman Period.

Gardner's Handbook of Greek Sculpture and Tarbell's History of Greek Art will be made the basis of a more general study.—*Three hours a week.*

[Plato and Aristotle.

Selections from the Gorgias and from the Nicomachean Ethics.—*Two hours a week.*

Omitted in 1903-1904; to be given in 1904-1905.]

Professor PATTENGILL:—

Herodotus. Books VI and VII.

Three hours a week.

[Thucydides and a Study of the Peloponnesian War.

Three hours a week.

Omitted in 1903-1904; to be given in 1904-1905.]

Assistant Professor SANDERS:—

Greek Epigraphy.

A study of the local alphabets and exercises in reading inscriptions.—*Two hours a week.*

SECOND SEMESTER.

Professor D'OUGE:—

Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week.*

Seminary in Plato's Republic.

Two hours a week.

Aristophanes.

Rapid reading course. The Clouds, The Acharnians, and The Frogs.—*Two hours a week.*

[Lucian.

Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week.*

Omitted in 1903-1904; to be given in 1904-1905.]

[Modern Greek.

A practical introduction and practice in reading specimens of modern Greek literature.—*Two hours a week.*

Omitted in 1903-1904; to be given in 1904-1905.]

[Aristotle's Athenian Constitution.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week.*

Omitted in 1903-1904; to be given in 1904-1905.]

Professor PATTENGILL:—**[The Bucolic Poets. The Idyls of Theocritus, Bion and Moschus.**

Three hours a week.

Omitted in 1903-1904; to be given in 1904-1905.]

Selections from the Anthology.—*Three hours a week.*

[Introduction to the Critical Study of Homer.**The Greek Minor Poets.**

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.

Three hours a week.

Omitted in 1903-1904; to be given in 1904-1905.]

Assistant Professor SANDERS:—**Greek Palæography.**

Two hours a week.

Dr. STUART:—**Greek Prose Composition.**

This course is intended for those who are preparing to teach Greek.—*Three hours a week.*

LATIN.

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the University collections of classical antiquities and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museums of Rome and Naples.

4. Casts of ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have lately been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 400 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmaeler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Professor KELSEY:—

Latin Seminary: Roman Philosophical Writers, with Special Study of Lucretius.

Open to graduate students only.—*Two hours a week, throughout the year.*

Lucretius.

Interpretations and lectures.—*Two hours a week, first semester.*

Roman Art, as studied in the Monuments.

General introduction to Roman Archæology; lectures on Roman architecture, sculpture, and painting. This course will be illustrated by photographs, engravings, and stereopticon slides, with occasional lectures upon the casts in the Art Gallery.—*Three hours a week, second semester.*

[The Topography and Monuments of the City of Rome.

Lectures, illustrated by photographs, engravings, and stereopticon slides.—*Three hours a week, second semester.* This course will be omitted in 1903-1904.]

[The Antiquities of Pompeii.

Illustrated lectures, summarizing the results of excavation and research at Pompeii as contributing to our knowledge of Greek and Roman art and life.—*One hour a week, first semester.* This course is omitted in 1903-1904.]

Professors KELSEY and DENNISON:—

Caesar's Gallic War (Teachers' Course, A).

Lectures. Papers prepared by those taking the course. Critical study of the text of the Gallic War, on the basis of Meusel's edition; studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical study of the Bucolics, and selected portions of the Georgics, Aeneid, and Appendix Vergiliana, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DRAKE:—

The Germania and Agricola of Tacitus.

Interpretations and lectures.—*Two hours a week, first semester.*

Roman Literature.

Interpretation of selections from representative authors, from Ennius to Boethius; lectures. *Four hours a week, first semester.*

General Course in Roman Literature.

Lectures and Topical Studies. This course is designed for students interested in the general subject of literature, who do not wish to make an intensive study of Latin. No knowledge of Latin is required. The Roman literature will be treated in its broad relations to the Greek literature and to modern literature.—*Two hours a week, first semester.*

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparisons.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law as given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, second semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

Professor DRAKE and Dr. MEADER:—

Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Professor DENNISON:—

Latin Inscriptions.

Reading of inscriptions of different periods from the De Criscio collection and from reproductions. Interpretation of selected inscriptions as casting light on the conditions of Roman life and society under the Empire.—*Two hours a week, second semester.*

[The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century.—*Two hours a week, first semester.*

This course will be omitted in 1903-1904.]

The Letters of Cicero.

Interpretation of selected letters, with a study of Roman manners and political conditions at the end of the Republic.—*Two hours a week, first semester.*

The Private Life of the Romans.

Lectures on Roman life, with a study of the social conditions of antiquity; illustrated by stereopticon slides.—*One hour a week, first semester.*

Professor DENNISON, Assistant Professor SANDERS, and Dr. MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Assistant Professor SANDERS and Dr. MEADER:—

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Dr. MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

[The Pseudo-Cæsarian *Bellum Africanum* and *Bellum Hispaniense*.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1903-1904.]

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

SANSKRIT.

Before beginning the study of Sanskrit, the student should have pursued courses in two of the three subjects Greek, Latin, and German for at least four semesters. The courses in Comparative Linguistics are open to students of modern as well as of ancient languages.

Dr. MEADER:—

Beginners' Course.

Grammar, and exercises in translation and composition. Text-books: Perry's *Sanskrit Primer* and Whitney's *Grammar*.—*Two hours a week, first semester.*

Advanced Courses.

A. Interpretation of the selections contained in Lanman's *Sanskrit Reader*, with elementary studies in the comparative morphology of the more important cognate languages.—*Two hours a week, second semester.*

B. Advanced Reading: Kalidasa's *Cakuntala*. Elements of Prakrit.—*One hour a week, first semester.*

[C. Advanced Reading: Selections from the Vedas.—*One hour a week, second semester.* This course is omitted in 1903-1904.]

Comparative Linguistics.

A general introduction to comparative Indo-European and classical philology. Lectures.—*One hour a week, throughout the year.*

SEMITICS.

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of "classical" and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

Professor CRAIG:—

Hebrew.*

1. Genesis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzsch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

2. Deuteronomy,

Joshua, I Samuel, Ruth, Jonah. Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

3. Prophetic Literature:

Amos and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

4. The Book of Job,

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

Assyrian.

1. Introduction to Easy Historical Inscriptions

From the Ninth Century, B. C., with study of the grammar. Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

2. Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V).—*Second semester.*

3. The Babylonian Stories of Creation,

The Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians. Inscription of Tiglath-pileser I, circa 1120 B. C.—*Two hours a week, first semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

4. Religious Literature.

King's "The Prayers of the Lifting-up of the Hand." Craig's "Religious Texts."—*Second semester.*

History and Archæology.

- (1) Lectures on the Ancient Babylonians, Assyrians, Hebrews, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

- (2) Lectures on the History of Israel and Judah
From earliest times to the Reformation of Ezra.

- (3) Lectures. Introduction to the Study of the Old Testament.

- (4) Lectures. Study of the Prophetic Books of the Old Testament.

- (5) Special Lectures. See Literary Announcement for 1903-1904.

Arabic.

1. Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

2. Selected Suras from the Quran,
Chrestomathia Qurani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

Aramaic, Syriac, Ethiopic.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

Hellenistic Greek.

Professor CRAIG:—

New Testament.

The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

Septuagint.

I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

FRENCH.

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1902-1903.

Professor CANFIELD:—

Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading and discussions. Open to undergraduates and graduates.—*Three hours a week, first semester.*

The Growth of Realism in the Nineteenth Century, Especially in the Novel.

This course involves a study of the transition from Romanticism to Realism, of the relation of Realism to the preceding movement, and of the influences that contributed to its ascendancy. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Three hours a week, second semester.*

Proseminary in French Literature.

The beginnings of literary criticism in France; the formation of the classical doctrine. Studies in the development of literary ideas in France. Primarily for graduates.—*Two hours a week, first semester.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

History of French Literature to the End of the Fifteenth Century.

Lectures, reading, and reports. Primarily for graduates.—*Two hours a week, first semester.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth, and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor DE PONT:—

Dramatists of the Eighteenth Century.

Lectures and reports. This course is designed to furnish a survey of the French drama from the Classical to the Romantic School. For undergraduates and graduates.—*Three hours a week, second semester.*

Assistant Professor EFFINGER:—

History of the Novel in France.

For graduates and undergraduates.—*Three times a week, throughout the year.*

Dr. THIEME:—

French Literature of the Sixteenth Century.

This course treats of the transition from the Middle Ages to the Renaissance and from the Sixteenth to the Seventeenth Century, with special study of Marot, Ronsard, Rabelais, Montaigne, Calvin, Jodelle, Garnier, and Hardy. Lectures, reading, reports. For undergraduates and graduates.—*Three hours a week, first semester.*

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

PROVENÇAL.

Professor CANFIELD:—

Outline of the Grammar, with readings in Appel's *Provençalische Chrestomathie*. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN.

The minimum requirement for admission to the courses announced below consists in courses 1 and 2 described in the University Calendar for 1902-1903, or an equivalent.

Professor LEVI:—

Dante: La Vita Nuova.

For undergraduates and graduates.—*One hour a week, first semester.*

Dante: La Divina Commedia.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Three hours a week, second semester.*

SPANISH.

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, described in the University Calendar for 1902-1903, or an equivalent.

Mr. CHENERY:—

Cervantes: *Novelas Ejemplares.*

Two hours a week, first semester.

History of Spanish Literature in the Sixteenth and Seventeenth Centuries.

Lectures and readings.—*Two hours a week, second semester.*

GERMAN.

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists in Courses 1, 2, 3, 4, 11, 12, and options in 5a, 5b, 5c, 7, 6a, 6b, 6c, 7a, and 8, as described in the University Calendar for 1902-1903, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 7, 6a, 6b, 6c, 7a, and 8 are primarily intended for undergraduates, but are recommended for graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's *Faust*.

Lectures and recitations. Thomas's edition. The drama is studied as a work of art, and the life and thoughts of Goethe, affording the basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on *Faust*, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt and Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Proseminary in Modern German Literature.

(a) Investigations in the æsthetic and philosophic writings of Schiller. Primarily for graduates.—*Two hours a week, the first semester.*

(b) Investigations in the works of Herder.—*Two hours a week, the second semester.*

Teachers' Course.

Lectures and discussions on the methods of teaching German and the organization of courses.—*Two hours a week, second semester.*

Assistant Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of Modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into Modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week, throughout the year.* Omitted in 1903-04, to be given in 1904-05.]

Dr. HILDNER:—

Hans Sachs.

Lectures and reports.—*Two hours a week, second semester.*

Dr. FLORER:—

The Early Writings of Lessing.

Lectures, investigations, and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Life and Works of Luther.

Lectures and reports. Special attention is paid to Luther's language. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Dr. BOUCKE:—

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and to give a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

[The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.* Omitted in 1903-04, to be given in 1904-05.]

GOTHIC.**Assistant Professor DIEKHOF: —****[Introductory Course.**

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.* Omitted in 1903-04, to be given in 1904-05.]

SCANDINAVIAN.**Dr. BOUCKE: —****Old Icelandic.**

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *Altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

JOURNAL CLUB —**Current Literature on Germanic Philology and Literature.**

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year, at which reports are made on the important contributions to Germanic philology and literature.

ENGLISH PHILOLOGY AND GENERAL LINGUISTICS.

The work of this department is concerned with the study of (1) the mother tongue, (2) the life and growth of language in general, and (3) the teaching of language.

Professor HEMPL: —**Old English.***

A general introduction to the subject.—*Four hours a week, first semester.*

[Old-English Phonology and Morphology.

This course consists of lectures on the history of Old-English sounds and forms, together with the private reading of Old-English prose texts and the investigation of two or three problems.—*Two hours a week, second semester.* Omitted in 1903 and 1904.]

*The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

Middle English.

This course consists of a brief introduction to the subject, the private reading of several of Chaucer's works, and the study of some of the more important questions of Chaucer's workmanship.—*Two hours a week, first semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern-English Grammar.

This course is intended specially for candidates preparing to teach English.—*Two hours a week, second semester.*

Special Problems.

This course consists in the investigation of a series of special problems in English philology, dealing chiefly with the historical development of certain phases of English speech.—*Two hours a week, each semester.*

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

The Teaching of Modern Foreign Languages.

It is the object in this course to give practical instruction in the teaching of modern foreign languages, as well as advice in the matter of preparation for teaching. There will also be given a brief survey of the most important methods now employed.—*Two hours a week, second semester.*

The Principles of Linguistic Science.

Lectures on the most important phases of the life and growth of language. It is the object in this course to furnish to students of either classical or modern languages an explanation of the phenomena of the languages they are studying, and to bring these scattered data into connection with the underlying principles.—*Two hours a week, second semester.*

ENGLISH.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in Eng-

lish for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the courses given in recent years are the following: The Development of the English Novel; The English Satirists of the Seventeenth and Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

See also the courses in English Philology and General Linguistics.

Professor DEMMON:—

English Literature Seminary.

Each student is expected, first, to present two papers during the semester, one an essay upon an assigned masterpiece, the other a critique of a fellow-student's essay; second, to participate each week in a general *ex tempore* discussion of the work under consideration; third, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Arcopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book I; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Browning's The Ring and the Book; Tennyson's Maud; Swinburne's Atalanta in Calydon.—*First semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; The Winter's Tale; Richard III; the two parts of Henry IV; Henry V; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth.—*Second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctly American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Principles of Criticism.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the semi-

nary work in English Literature and Shakespeare.—*Throughout the year.*

Studies in the text of Shakespeare.

The aim will be to illustrate the methods of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

Professor TRUEBLOOD:—

Study of Great Orators, ancient and modern.

Lectures on methods of public address and source of power. Study of representative selections. The method is similar to that in the English Literature Seminary.—*Throughout the year.*

Oral Discussions.

This course is designed to develop readiness of extemporization. It involves the application of the principles of formal logic and elocution in the discussion of leading topics of the day. Students are required to present briefs of the subjects discussed.—*Throughout the year.*

RHETORIC.

Professor SCOTT:—

Seminary in the Theory and the History of Rhetoric. Problems of Rhetoric.

The subjects of discussion will vary from year to year. Among the problems to be investigated are the following: The nature and origin of the leading types of prose structure; the rhythm of prose; the development of paragraph structure; the origins of prose; the morphology of publication; the psychology of figures of speech; the sociological basis of the principles of usage. A few lectures will be given on the general outlines of rhetorical theory, with especial attention to the sociological and psychological interpretation of rhetorical processes.—*Throughout the year.*

Principles of Style: Studies in Modern Prose.

Inductive study of masterpieces of English prose, with a view to verifying rhetorical principles. Lectures, readings, discussions.—*First semester.*

Teachers' Course.

Methods of teaching English Composition and Rhetoric.—*Second semester.*

The course includes (1) a discussion of the principles—æsthetic, psychological, and sociological—which underlie the most notable

theories of rhetoric and composition; (2) an application of these principles to certain urgent problems in the teaching of English; (3) practical suggestions with reference to the planning and management of composition work in secondary schools; (4) a critical examination of recent text-books.

MUSIC.

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the latest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

First Group.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

Second Group.

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Researches in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or a minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY.

Professor HUDSON:—

The History of Europe Since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, the partition of Africa, and the problems raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

Two hours a week, throughout the year.

The course of the first semester combines an examination of the social, economic and political condition of Russia, with a

study of the advance of Russia in Europe and in Asia. During the second semester a study is made of the problems of the Far East.

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor Dow:—

Studies in Medieval and Early Modern European History.

Two hours a week, throughout the year.

This work constitutes a cycle of three courses, each running through two semesters. It thus varies in subject matter from year to year, and may be elected several times. The first course (9a and 10a) in the cycle relates to the history of France, and chiefly to institutions. In the first semester a study is made of the institutions of the feudal period; in the second, attention is directed to changes that took place in the later medieval and early modern periods. The second course (9b the first semester, and 10b the second) is devoted to a study of special topics, relating chiefly to Italy, Germany, and the church from the decline of Rome to the end of the thirteenth century. The third course (9c and 10c) treats of the period of the Renaissance and the Reformation, and consists, like the other two, of a series of logically related special studies. The aim of the work, aside from gaining an intensive knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied, especially in preparing oral and written reports.

Seminary in Medieval History.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatics, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.—*Two hours a week, throughout the year.*

Dr. CROSS:—

English History.

Two hours a week, throughout the year.

An advanced course in English History is given each semester, consisting of lectures illustrated by selections from contemporaneous documents, assigned reading, and written reports. The first course deals with the origin and development of institutions in the medieval period; the second is concerned mainly with the constitutional aspects of the Puritan Revolution.

Assistant Professor FAIRLIE:—

Federal Administration.

This is a course in the principles and working machinery of the United States federal administration. It is intended to give a general knowledge of the practical operation of the government service and to show the opportunities for college graduates in the various branches of administration. The lectures begin with a study of the administrative authority of the President; the organization and influence of the Cabinet; and the executive powers of the Senate. The nine Executive Departments will then be studied in turn: the State Department, and the diplomatic and consular service; the Treasury Department, including the customs and internal revenue services, and the bureaus which supervise the currency; the War and Navy Departments; the Department of Justice; the Postoffice Department, and the various branches of the postal service; the Department of the Interior, including the management of the public lands, patents, pensions, and Indian relations; the Department of Agriculture; and the Department of Commerce and Labor, including the bureaus transferred from the older departments and the new bureaus of manufactures and corporations. Attention will be given to the Inter-State Commerce Commission, and also to the Civil Service Commission, noting its methods and results and the means of entering the federal service. Finally, the organization and jurisdiction of the federal judiciary will be examined, embracing the District and Circuit Courts, the Circuit Courts of Appeal and the Supreme Court of the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers. Local government, including county, township, and municipal administration, will be studied. And the organization of political parties, and their influence on the work-

ing of the governmental machinery, will be investigated and discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, first semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, second semester.*

Comparative Administrative Law.

In this course, special attention will be given to English local administration, showing the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the combination of bureaucratic and popular administration in Prussia, and the system of special administrative courts in both countries. The central administration of these countries will also be examined, including the chief executives and the ministerial departments, with an account of the systems of examinations and training for the civil service. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Three hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with

municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties and their machinery, recent legislation concerning primaries, reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Seminary in Administration.

These are courses for original research on special topics. During the first semester of 1903-04, the subject will be a comparison of the consular service of the United States with that of European countries. In the second semester, a study will be made of municipal monopolies and the problem of municipal ownership. Special arrangements may also be made with students for work on other topics.—*Two hours a week, each semester.*

Additional advanced courses in Administrative Law are offered in the Law Department, viz.: Public Officers, Taxation Public Corporations, and the Science of Jurisprudence.

AMERICAN HISTORY.

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extending over two years and a half, beginning with lectures on colonial history, and ending with a seminary in which special problems are investigated in original material. Reference may also be made to a

course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American history, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history. A number of short courses of lectures by various well-known writers and teachers from other universities has been provided for the year 1903-1904.

Mr. CORWIN:—

American Colonial History.

Three times a week, second semester.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, to cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.

History of the Civil War and the Period of Reconstruction.

Three times a week, first semester.

Chief emphasis is laid on constitutional and political questions of the time, such as causes of secession, legal justification of secession, war powers of the President, methods and plans of reconstruction, etc., but military movements are not neglected.

Assistant Professor VAN TYNE:—

Constitutional and Political History of the United States, 1775-1861.

Three times a week, throughout the year.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully of the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort also is made to trace the political and social development of the country.

Seminary in American History.

Two hours a week, throughout the year.

This course is primarily for graduate students who have already done a good deal of historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. In 1903-1904 the period of Revolution, 1775-1783, will be studied. Graduate students will receive individual attention and assistance in the prosecution of their investigations.

Studies in American History.

Two hours a week, throughout the year.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Written reports are prepared under the direction of the professor. Special facilities are given for the use of the library.

PHILOSOPHY.

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

A. SEMINARIES.

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD.

History of Philosophy, Professor LLOYD.

Ethics, Professors WENLEY and LLOYD.

Modern Systems, Professors WENLEY and LLOYD.

Ancient Philosophy, Professor WENLEY and Assistant Professor

REBEC.

Philosophy of Religion, Professor WENLEY.

Aesthetics, Assistant Professor REBEC.

Epistemology, Professor LLOYD.

Logic, Assistant Professor REBEC.

Psychology, Rational and Experimental, Assistant Professor

PILLSBURY.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been removed to the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY.

Professor WENLEY:—

*The Philosophy of Kant.

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

*The Philosophy of Hegel.

• Study of the Logic and discussions.—*Two hours a week, second semester.*

Professor LLOYD:—

*Philosophy since Hegel.

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

*Philosophy of History.

Lectures and study of special periods.—*Two hours a week, first semester.*

Assistant Professor REBEC:—

*American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

*Plato's Republic.

Collateral reading and theses.—*Two hours a week, first semester.*

C. ETHICS.

Assistant Professor REBEC:—

*Aristotle's Ethics.

Collateral reading and theses.—*Two hours a week, second semester.*

D. PSYCHOLOGY.

The Psychological Laboratory is well equipped for original investigation; and its facilities will be greatly improved in the fall of 1903, when a new building will be occupied.

Assistant Professor PILLSBURY:—

Original Investigation.

Hours as may be assigned, throughout the year.

E. SPECIAL COURSES.

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

Philosophy of Religion.

Two hours a week, first semester.

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, second semester.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1903-04 to the philosophy of evolution.—*Two hours a week, first semester.*

Assistant Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

THEORY AND HISTORY OF ART, AND ARCHAEOLOGY.

A. THEORY OF ART.

Assistant Professor REBEC:—

Æsthetics.

Two hours a week, first semester.

Elect in the Department of Philosophy; see p. 40.

Principles and Problems in Æsthetic History.

Two hours a week, second semester.

Elect in the Department of Philosophy; see p. 40.

Professor WINKLER: —

Lessing's Laokoon.

Two hours a week, second semester.

Elect in the Department of German; See p. 26.

Schiller's Æsthetics.

Two hours a week, first semester.

Elect in the Department of German; see p. 27.

B. ART AND ARCHÆOLOGY.

Professor CRAIG: —

Interpretation of the Monuments of Babylonian and Assyrian Art.

Illustrated lectures.—Two hours a week, first semester.

Elect in the Department of Semitic Literature and History; see p. 23.

Professor D'OUGE: —

History of Greek Art.

Three hours a week, first semester.

Elect in the Department of Greek; see p. 15.

Professor KELSEY: —

The Antiquities of Pompeii.

Illustrated lectures.—One hour a week, first semester.

Elect in the Department of Latin; see p. 18.

The Topography and Monuments of Ancient Rome.

Three hours a week, second semester.

Elect in the Department of Latin; see p. 17.

Roman Art.

Illustrated lectures.—Three hours a week, second semester.

Elect in the Department of Latin; see p. 17.

THE SCIENCE AND THE ART OF TEACHING

Professor PAYNE: —

History of Education, Ancient and Medieval.

Recitations and lectures. Text-book: Compayré's History of Pedagogy.—*Three hours a week, first semester.*

Graduate Seminary.

A critical study of Spencer's *Education*.—*Two hours a week, first semester.*

Theoretical and Critical Pedagogy.

The principles underlying the arts of teaching and governing. Lectures and readings. Text-book: Contributions to the Science of Education.—*Three hours a week, second semester.*

History of Modern Education.

Recitations and lectures. Text-book: Compayré's *History of Pedagogy*.—*Three hours a week, second semester.*

Graduate Seminary.

A critical study of Herbart's *Pedagogy*.—*Two hours a week, second semester.*

POLITICAL ECONOMY AND SOCIOLOGY.

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy" or "Social and Industrial Reform" [not given in 1903-1904]. For description see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduate as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as "Graduate Courses" are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may combine with advantage, the courses offered in sociology and political economy, with courses offered in other departments of the University.

Professor ADAMS:—**History of the Development of Industrial Society.**

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to

show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

[Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions. Not given in 1903-1904.—*Two hours a week, second semester.]*

Administration of Corporate and Public Industries.

This course undertakes an analysis of industrial organization primarily from the administrative point of view. It considers the history and social significance of rapid transit in cities, and of other quasi-public industries. It studies railway administration under public as well as private ownership, and makes a special investigation into the history, organization, and administration of the Post-office Department of this and other countries. Alternates with the preceding course.—*Two hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. The seminary for the academic year 1903-1904 will study the financial history of the United States as presented in the annual reports of the Secretary of the Treasury. This subject will claim the attention of the Seminary throughout the year.

Professor TAYLOR:—

Principles of Finance.

In this connection the word Finance is used in the technical rather than the popular sense. That is, it does not include Money, Banking, Stock Speculation, or any of the allied topics. It is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial considerations, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to Taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out. Lectures and quiz.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the Media of exchange, including Money and its various Credit Substitutes. This is followed by a study of the Natural Laws governing monetary phenomena, such as those which fix the Monetary Standard, those regulating the Movement and Distribution of Money, and so on. Next comes a sketch of Monetary History,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems. Lectures and text-book.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking Instruments and Operations. This is followed by a study of banking Principles,—the natural laws which regulate the safety of banking, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the History of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States. Lectures and text-book.—*Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor retains the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the Nature of Capital, the Origin of Interest, the Laws of Value, and so on. The work of the class hour includes the discussion of readings assigned to the class generally and of reports on readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor retains the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this

course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of Economic Theory; and so on.—*Two hours, second semester.*

Assistant Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements, and other sociological questions of present interest.

The class is supplied with a list of about twenty-five topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

Historical Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order*, Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field will be used. This course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, first semester.*

Special Work with Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as is found practicable and expedient.—*First and second semesters.*

Assistant Professor JONES:—

The Resources and Extractive Industries of the United States.

Lectures and assigned readings. *Three hours, first semester; M, W, F, at 9; Room 11, T. H.*

The first part of the semester is occupied with a study of the physical and social resources of the United States, including such topics as location, coasts, topography, climate, geology; physiographic, botanical and economic regions; total population; sex, race and age classes, density and distribution of the population, and the social and political circumstances which determine the industrial efficiency of the American people.

The second part of the semester is occupied with studies in the industries connected with American agriculture, forestry and mining. In this part of the course the history of each industry is carefully traced, its present development and distribution are indicated, and its probable developments in the immediate future are discussed.

The Manufactures of the United States.

Lectures and assigned readings. *Three hours, second semester; M, W, F, at 9; Room 11, T. H.*

The history, methods, present location and condition of our chief manufacturing industries will be presented. The relation of these industries to one another, to sources of raw materials, means of transportation, market facilities, and foreign trade will be discussed. In the case of some industries the organization and policy of dominant corporations will be described. In this course, as well as the one preceding it, a liberal use is made of photographs and maps and charts to illustrate the subject.

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account

of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, known as middlemen, who are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

First semester, two hours. Tu. and Th., at 9, Room 11, T. H.

As introduction to the study commerce will be defined, and the institutes of commerce, the market price, grades, weights and measures, and credit customs, will be discussed. Under agricultural marketing the various systems employed in the United States will be presented, viz., commission selling, coöperation, public market, private market, contract, and speculation. A special account will be given of the marketing of grain, cotton, tobacco, live stock, dairy products, fruit, and wool.

b. The Manufacturer's Problem of Distribution.

Second semester, two hours. Tu. and Th., at 9, Room 11, T. H.

The requirements of marketing as they effect the technique of manufacturing will be discussed, together with the principles governing the determination of price and quality. The various outlets employed in direct and indirect selling will be described in detail and the methods of stimulating trade. Efforts to regulate competition in the sale of manufactures whether by trade marks, the factor system, curtailment and price agreements, pools, consolidations, or the laws of unfair trade, will be considered.

c. Wholesale and Retail Trade.

First semester, two hours; Tu. and Th., at 10; Room 11, T. H.

The principles of modern wholesaling and retailing will be discussed and a description given of the various forms of brokerage and jobbing, agency and commission selling; also of general and specialty stores, department stores and mail order houses.

Technique of Foreign Trade.

Two hours, second semester; Tu., Th., at 10; Room 11, T. H.

Treats of the supply and demand areas of the world with reference to the chief articles of international trade. It comprises a study of the documents, regulations and customary procedure of foreign trade, including methods of selling goods in foreign countries, shipping routes, port regulations, customary packages, weights and measures, tariffs, export bounties, commercial treaties, foreign industrial legislation, and the regulations of the consular service.

[European Commercial Geography.]

Lectures and assigned readings. *Two hours, second semester; Tu, Th, at 9; Room 11, T. H.*

Not given in 1903-1904.]

The object of this course is to give a brief presentation of the resources and industries of the chief European states. Particular emphasis is laid upon openings for American trade.

[American Trade with China, Japan and the Philippines.]

Lectures and topical reports. *Two hours, second semester; Tu, Th, at 9; Room 11, T. H.*

Not given in 1903-1904.]

This course will include a statement of the resources and industries of the countries mentioned. It will also include a consideration of the present and probable future trade of the United States with them, as conditioned by climate, race, language, social customs and prejudices, and political conditions.

Dr. GLOVER:—

Theory of Annuities and Insurance.

Two hours, first semester.

This course will be a fairly detailed development of the theory of simple and compound interest and the theory of probability with their application to life insurance based upon tables of mortality. It is proposed to consider the following subjects: annuities, pure endowments, mortality tables, life insurance based on same, method of deducing net premiums, single, annual, and limited, endowment insurance, commutation tables, reserve, surplus, loading, dividends, and various features pertaining to actuarial science. If time permits, the consideration of investment rates on funded stocks and bonds will be taken up.

Theory of Annuities and Insurance.

Two hours, second semester.

This course, in a general way, will be a continuation of the theory developed in the preceding course. In particular, it will include the use and practice with the arithmometer in the construction of actuarial tables, the systematic fitting and adjusting of mortality tables and statistical data with special reference to Pearson's method of moments, the application of the Calculus of Finite Differences to actuarial questions, and a more elaborate consideration of the theory of insurance on several lives.

INTERNATIONAL LAW.

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week. first semester.

History of Treaties.

Two hours a week, second semester.

MATHEMATICS.

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

This course forms a direct continuation of the course in elementary mechanics; it is mainly devoted to the dynamics of a rigid body.—*Three hours a week, second semester.*

Projective Geometry.

This course begins with the pure geometry of position, Reye's work being used as a text; this is followed by the analytic treatment, with the aid of homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Dr. HALL:—

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Dr. GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots; resultants; solution of a system of n linear equations; theorems concerning integral functions of one and two variables; elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

(This course is described under Political Economy and Sociology.)

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Jordan's *Cours d'analyse*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Beginning with simple problems in attraction, the course develops the fundamental properties of the potential function; then the general theory of vector fields is discussed and applied to some particular branch of mathematical physics.—*Three hours a week, first semester.*

Assistant Professor MARKLEY:—

Theory of Functions.

The first part of this course deals with functions of real variables in which are developed the fundamental ideas of irrational numbers, continuity, and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometrical representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

PHYSICS.

The courses announced below presuppose about one and a half years' collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—

Electrochemistry.

Three hours a week, first semester.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.

Alternating Current Phenomena: Steinmetz.

Two hours a week, second semester.

The course includes the application of complex quantities to the study of alternating current phenomena, and is accompanied by a course in laboratory work in which the conclusions are verified.

Professor CARHART and Assistant Professor GUTHE:—

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a very thorough treatment of the subjects of capacity, inductance, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester*; *three times a week, second semester.*

Professor PATTERSON :—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distributions, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three hours a week, first semester*; *two hours a week, second semester.*

Dynamo-Electric Machinery.

Lectures, *two hours a week*; laboratory work, *once or twice a week, second semester.*

Alternating Currents.

Lectures, *two hours a week*; laboratory work *once a week, first semester.*

The courses in Dynamo-Electric Machinery, Alternating Currents and Alternating Current Phenomena form a graded series covering the theory of dynamo-electric machines, alternate current working, transformers, and alternate current phenomena as applied to generators, distribution of power, and induction motors. Laboratory work forms a part of the first two courses.

Professor REED :—

The Theory of Sound.

Lectures and laboratory work. The lectures are based upon the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems;

also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—Lectures, *two hours a week*; laboratory work, *twice a week*, first semester.

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week*, second semester.

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week*, first semester.

Assistant Professor GUTHE :—

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations, *two hours a week*, second semester. This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of these principles to numerous problems in physics and chemistry.

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week*, first semester.

CHEMISTRY.

Resident graduates, registered under the provisions of Admission and Registration given on page 10, may enter upon any of the courses in chemistry in this University for which they are qualified. A full description of these studies can be obtained in the ANNOUNCEMENT OF COURSES IN CHEMISTRY, for 1903-04, issued

separately. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to the following named undergraduate courses in this University (University Calendar for 1902-1903; Courses 1 and 2, Courses 3 and 5, Course 7, —making in all about twenty-five hours of undergraduate credit.* If chemistry be taken as a minor subject in work registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1 and 2, the opening courses in general chemistry.

Candidates for a doctor's degree, in addition to the requirements above specified, must have satisfied the committee in charge of their studies as to their fitness to enter upon the higher work. A reading knowledge of German and French is necessary.

Graduate students who are not in work for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

* THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for convenience of the readers. Chemical technology, metallurgy, sugar chemistry, phyto-chemistry, food analysis, pharmacy, and pharmacology, are provided for.

A. GENERAL AND PHYSICAL CHEMISTRY.

Professor FREER:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Chemical Literature; Journal Club.

The Journal Club discusses current chemical literature. It is under the direction of Professor FREER, but the professors, instructors, and assistants in the laboratory take part therein. All of the prominent journals are divided among the participants, who report on the most interesting topics in rotation.—*One hour to one and one-half hours a week, throughout the year.*

Laboratory Research.

The work may be either organic or inorganic, and the student is at liberty to select one from a number of topics proposed. The

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during one semester.

work includes the study of the literature bearing upon the topics. In order to accomplish results the student should have at least five clear half days a week to devote to the work. This statement applies to all research courses.—*Hours arranged with instructor, throughout the year.*

Assistant Professor BIGELOW:—

Physical and Theoretical Chemistry.

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry. It must precede or accompany laboratory work in this subject. Lectures.—*Four hours a week, second semester.*

Physical and Theoretical Chemistry.

Advanced Course. Electro-Chemistry and selected topics. Lectures.—*Two hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Two courses cover, as far as possible, the ground outlined in the lectures. They include the standard methods of determining molecular weights, studies of solutions, dissociation, electro-chemistry, etc. The first course at least is essential for all who wish to become acquainted with modern chemistry.—*Hours arranged with instructor.*

Laboratory Research.

Physical Chemistry.—*Hours arranged with instructor.*

Mr. HIGLEY:—

Laboratory Work in Selected Topics of Inorganic Chemistry, including Inorganic Preparations.

This work is preparatory to research and is also especially intended for teachers.

Laboratory Research in Inorganic Chemistry.

Hours arranged with instructor.

Dr. HULETT:—

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and also includes a training in preparing demonstrations proper for use in teaching.—*Hours arranged with instructor, throughout the year.*

Laboratory Research, Including Work in the Determination of Atomic Weights.

Hours arranged with instructor, throughout the year.

Mr. LICHTY:—

Laboratory Work with the Polariscopes and the Spectroscopes.

This course includes the theory of the instruments, their practical applications, and the study of stereochemical questions involved.—*Hours arranged with instructor, second semester.*

B. ORGANIC, INDUSTRIAL AND ANALYTICAL CHEMISTRY.

Professor PRESCOTT:—

Studies in Recent Research.

Library work upon chosen questions, discussions, and the writing of reviews.—*Throughout the year.*

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, in either first or second semester.*

Investigation in Organic or in Analytical Chemistry.

Laboratory and library research upon subjects selected, *throughout the year.*

Analytical Organic Chemistry, with Assistant Professor STEVENS or with Dr. DUNLAP:—

Laboratory studies upon the alkaloids, the fats, the analysis of foods, and other chosen subjects.—*Hours arranged with instructor, throughout the year.*

Professor JOHNSON:—

Qualitative Analytical Chemistry.

Following undergraduate Course 3 (University Calendar for 1902-1903) or its equivalent. Laboratory work and lectures.—*Lectures once a week, second semester; laboratory work, including electrical methods, hours arranged with instructor.*

Professor CAMPBELL:—

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1902-1903) or its equivalent. Laboratory work directed by lectures in any of the three courses, namely: (1) Advanced quantitative methods in general, (2) the analysis of minerals, (3) iron and steel analysis. Electrolytic methods are much employed, and there is a room devoted to their use.—*Hours arranged with instructor, throughout the year.*

Investigation in Analytical Method, Inorganic Structure, and Metallurgical Chemistry.

Laboratory work upon questions related to researches published from this department. Use is made of Le Chatelier's pyrometer, as well as of calorimetric methods in study of heats of formation. Special work is given in micrometallography, as bearing upon the constitution of metals and their alloys.—*Hours arranged with instructor, throughout the year.*

Professor CAMPBELL and Mr. WHITE:—

Technical Methods and Investigations. Laboratory work as follows:—

- (1) Gas Analysis, Calorimetry, and Photometry.
- (2) Technical Examination of Gold and Silver Ores.
- (3) The Cement Industry, with special reference to influence of composition and temperature of burning.
- (4) Coal, gas and by-products.
- (5) Influence of heat and mechanical treatment on constitution of iron and steel.
- (6) The chemistry of beet sugar, with special reference to its manufacture.

Other subjects may be chosen after consultation.—*Hours arranged with instructor, throughout the year. In (2) the work must begin in first semester.*

Assistant Professor SCHLOTTERBECK:—

Phytochemical Research.

The chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.—*Laboratory work, throughout the year.*

Professor GOMBERG:—

Lectures on the Benzene Derivatives.

Following undergraduate Course 7 (University Calendar for 1902-1903) or its equivalent.—*Four hours a week, second semester.*

Organic Synthesis and Ultimate Analysis.

Laboratory work.—*Hours arranged with instructor, throughout the year.*

Investigation in Organic Chemistry.

Laboratory work upon subjects related to Professor Gomberg's published researches.—*Hours arranged with instructor, throughout the year.*

Mr. WHITE:—

Chemical Technology.

Lectures on the main chemical industries, inorganic in the first semester, and organic in the second semester. Among the subjects treated are the alkali and acid industries, cements, wood and coal distillations, beet sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Dr. SULLIVAN:—

Investigation of Inorganic Reactions.

Laboratory and library research. The application of the methods of physical chemistry to analytical investigation. Apparatus for measurement of electrical conductivity and potential differences of solution, thermostats for determination of solubility, and the usual other facilities for work of this nature are provided. A course is also given in the identification of organic substances with the aid of the microscope.—*Hours arranged with instructor, throughout the year.*

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY.

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN:—

Original Research on the Causation of Disease.

The study of the chemistry of bacterial cells.—*Hours arranged with instructor, either first or second semester.*

Professor NOVY:—

Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus, and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1902-3.—*Hours arranged with instructor, either first or second semester.*

Advanced Physiological Chemistry.

Laboratory work and reading.—*Hours arranged with instructor, either first or second semester.*

Methods of Hygiene.

Chemical and bacteriological examination of water, air, soil, milk, butter, etc.—*Hours arranged with instructor, either first or second semester.*

ASTRONOMY.

A knowledge of general astronomy and calculus is required for all courses. In the theoretical courses a careful training is given in those principles of exact astronomy which should be prerequisites for all investigations.

Professor HALL:—

Spherical Astronomy.

Transformation of coördinates, precession, nutation, aberration, determination of fundamental constants, and theory of instruments.—*Three hours a week, throughout the year.*

Theory of Least Squares.

Two hours a week, first semester.

Theory and Computation of Orbits.

Five hours a week, first semester.

Mathematical Theory of Planetary Motion.

Three hours a week, second semester.

Extended Practical Course.

Hours arranged with instructor, throughout the year.

NOTE.—The Observatory is provided with a 12¾-inch equatorial by Fitz, a 6½-inch Pistor and Martins meridian circle, 6-inch Fauth equatorial, 3-inch meridian transit with zenith telescope, attachments, surveyor's transit, sextants, chronograph, and chronometers.

MINERALOGY.

The higher work in mineralogy presupposes an acquaintance with general and analytical inorganic chemistry, and at least such knowledge of mineralogy as could be obtained from a course of study combining theoretical instruction with practice in determining minerals. The special character of the work in each case is determined after consultation with the applicant. The work is directed by Professor PETTER.

GEOLOGY.

The course of instruction in geology for undergraduates, as announced in the University Calendar for 1902-1903, embraces from two to three years University work. The first year is devoted to elementary studies in physical geology, historical geology,

and physical geography, giving three hours a week to each for one semester. During the second year more detailed instruction is given, two hours each week, in the same general subjects. Each student is given a special subject for investigation in connection with which a thesis of about 2,500 words is required. During the second semester palæontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary courses have been pursued. Those who have done more work than is represented by the elementary course may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of geology will be read with special reference to Pleistocene geology, and to the origin and classification of topographic forms, glacial records, lake histories, erosion, and all of the processes by which the surface of the earth has come to have its present form.

The geological museum is being arranged and a series of fossils selected to illustrate the life history of North America. This collection is intended especially for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lectures will be returned to the cases in the museum, where they will be available for examination at any time.

There is a second collection embracing some ten thousand specimens of both American and European fossils, which is arranged zoologically and intended for the use of advanced students in palæontology. Special collections of rocks, brachiopods, corals, etc., numbering from one hundred and fifty to two hundred specimens each, are arranged in the geological laboratory for the immediate use of students.

The collection in physical geology is small, but efforts are being made for its enlargement, and ample material will be on hand to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them in cases provided for the purpose, and facilities for consulting original monographs and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopes and photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

The work in geology is conducted by, or under the direction of, Professor RUSSELL.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given in the University Calendar for 1902-1903. A library shelved in the laboratory contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in the literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a *minor for the master's degree* will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctorate a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a *major for the doctor's degree* are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement, and the special announcement of the department.

Those electing zoology as a major, will find it of advantage to select, as a *minor study*, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.**Professor REIGHARD:—****Embryology of Vertebrates (Organogeny).**

Three lectures and, laboratory work, about 12 hours per week (mornings).

The laboratory work is largely on the chick, with supplementary material from other vertebrate classes. Much attention is given to methods of studying serial sections, and to the preparation of anatomical descriptions and drawings from such sections. The lectures treat of vertebrate development from the comparative standpoint.—*Six hours per week, first semester.*

Vertebrate Zoology and Comparative Anatomy.

Three lectures or quizzes. Laboratory work (about 12 hours per week).

In addition to the regular class meetings there is a quiz or demonstration hour optional with the instructor. Occasional excursions are arranged on Saturdays for the field study of the habits of vertebrates, and for collecting. Lectures on the classification, habits, and distribution of vertebrates occupy about one-fourth of the lecture hours; the remaining hours are devoted to Comparative Anatomy of the Vertebrates, with special reference to the evolution of the organs of the higher vertebrates from those of the lower members of the group. Laboratory work is on selected forms, the lancelet, the lamprey, the skate, the perch, the turtle, the pigeon, and the cat or rabbit, together with a study of preparations of other forms. It is carried on altogether by means of typewritten laboratory directions prepared by the instructors.—*Six hours per week, second semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Assistant Professor JENNINGS:—**Physiological Zoology.**

This course treats of the processes occurring in living matter,—of the general physiology of animals,—those features of the life processes that are common to organisms. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures per week and two half days of laboratory work.

Some acquaintance with physical chemistry will be found valuable for those who intend to pay especial attention to the physiological side of biological science; for any extensive progress in this direction such acquaintance is indispensable.

Students who have had one year's work in Biology (Botany or Zoology) are permitted to take this course. It may appropriately be taken in the second semester of the same year in which Invertebrate Zoology (Course 4) is taken:—*Four hours per week, Systematic Zoology: The Rotifers.*

Students will work on the local fauna.—*Two or three hours, throughout the year.*

Dr. HOLMES:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.

This is a year's course, but is so divided that the two parts are given in the first semesters of alternate years. Course 4a deals with Protozoa, coelenterates, worms, crustaceans, and several smaller groups. Course 4b includes molluscs, echinoderms, myriapods, arachnids, and insects.

Course 4b will be given in 1903-04.—*Five hours, first semester.*

Systematic Zoology: The Crustacea.

Students will work on the local fauna.—*Two or three hours a week, throughout the year.*

Dr. PEARL:—

Statistical Zoology.

Lectures dealing with the methods and important results of the statistical study of variation. Especial attention will be paid to the methods used in this work, the aim being to give the student a knowledge of the manner in which biological statistics are collected and treated. To this end exercises in handling

statistics gathered from various sources will be assigned in connection with the lectures. The significance of the results which have been obtained by the use of the statistical method, with reference to current theories of heredity, correlation, etc., will be discussed.

Laboratory work to accompany the lectures may be elected as Course 6a. Each student will be assigned a definite, small problem for investigation. In the assignment of these problems special attention will be paid to types found abundantly in the local fauna.—*Two hours per week, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or Physiology. Laboratory work, lectures, and quizzes.—*Six hours per week, second semester.*

The Technical Methods of Zoology.

This course is designed to give the student a knowledge, both theoretical and practical, of some of the technical methods most frequently used in zoological work. The following are among the topics treated: The construction, care, and proper use of the common pieces of apparatus, the collection (or acquisition in other ways) of the organisms ordinarily used in laboratory teaching; various methods for the preservation of organisms, with a discussion of their special uses; the preparation of illustrative material (models, charts, etc.); the theory of microscopical technique; the more generally used methods in microscopical technique, including skeletonizing, injecting, making dry preparations, etc., the making of the various special preparations useful in elementary courses in zoology; and the economical equipping of a laboratory. The course is developed in the main from the standpoint of the prospective teacher. No text-book is used, but collateral reading is assigned in such works as Lee (1900), Whitman (1885), and Gage (1899), and in the current technical periodicals.—*Two hours per week, first semester.*

Mr. Charles C. ADAMS:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its

influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology. The lectures and conferences outline the general principles.

The field trips are devoted to the study of the animals, the conditions under which they live; methods of observation, taking notes and collecting; special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and amphibians and reptiles among vertebrates. One class meeting and two afternoons laboratory work each week.—*Three hours per week, second semester.*

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates.

Assistant Professor JENNINGS:—

Investigations in experimental zoology; the reactions of animals to stimuli.

Dr. HOLMES:—

Investigations in

- a) Cytology.
- b) The behavior of animals.

The ZOOLOGICAL FACULTY:—

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although the meetings are open to all, the membership is restricted.—*One hour a week, throughout the year.*

FIELD CLUB.

This is a voluntary organization of zoological students for the purpose of studying the local fauna. Field excursions are made at regular intervals, and occasional meetings are held for lectures and for other purposes. Members of the zoological staff are members of the club, and take part in its work. The zoological staff has further undertaken a systematic study of the local fauna. Instruction is offered in the subject (see under Systematic Zoology) and it is hoped thus to stimulate field work.—*Throughout the year.*

BOTANY.

The work in botany in this University is divisible into morphology, physiology, and ecology. For their study there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. A plant garden on the campus, adjacent plant houses, and woods, fields, swamps, and waters in the vicinity furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to preparation and needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctorate, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found on pages 9-10 of this Announcement.

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below, nearly all of which consist largely of laboratory work.

Professor SPALDING:—

[Ecology.

A study of the habits and adaptations of plants. The floras of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more hours a week, first semester.*

Omitted in 1903-1904.]

[Distribution of Plants.

Lectures in connection with studies of the local flora.—*Two or more hours a week, second semester.*

Omitted in 1903-1904.]

Professor NEWCOMBE:—

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more hours a week, throughout the year.*

Teachers' Course.

Conferences and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations.—*One hour a week, second semester.*

Dr. POLLOCK:—

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three hours a week, second semester.*

Dr. BURNS:—

Experimental Morphology.

Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two hours a week, first semester.*

THE BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

B. PRIMARILY FOR GRADUATES.

Professor SPALDING:—

[Ecological Investigations.

Problems as to the origin of specific characters; variation; and the origin of local plant societies.

Omitted in 1903-1904.]

Professor NEWCOMBE:—**Investigations in Physiology and Cytology.**

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

THE BOTANICAL FACULTY:—**Field Club.**

Excursions under the direction of different members of the staff of instructors are made for the purpose of becoming familiar with the local flora and studying the habits of its plant societies.—

Second semester.

FORESTRY.**Professor ROTH:—****1. Introduction to Forestry.**

A general presentation of the subject, its history, object, and methods, as well as economic importance.

This course is intended chiefly for teachers, for students of political economy, and others who may wish a general review of Forestry. Lectures.—*Two hours, first semester.*

Mr. C. A. DAVIS:—**2. Silviculture.**

This course is given as follows:

(2a) Silviculture. Introductory, including the study of soil, climate, and other conditions of site, and their influence on forest growth. Lectures, laboratory and field work.—*Three hours, first semester.*

(2b) Silviculture; methods of artificial and natural reproduction; seed-bed and nursery work; planting and sowing in the forest; reforestation of denuded lands, planting on prairies, climes, etc. Lectures and field work.—*Three hours, second semester.*

(2c) Silviculture. Care of forest; cleaning and thinning; protection of forests against insects and other enemies. Lectures and field work.—*Three hours, first semester.*

Courses 2a-2c should be taken in the order here given, and are open only to students in Forestry.

Professor ROTH:—**3. Forest Mensuration and Description.**

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurement of the rate of growth of trees and stands; methods and

manner of describing a tract of forest to enable its proper management. Lectures, laboratory and field work.—*Three hours, both semesters.*

Open only to students in Forestry.

4. Forest Utilization.

Use of timber; points of production and market; methods of lumbering, milling and marketing; minor forest industries. Lectures.—*Three hours, first semester.*

Open only to Forestry students.

5. Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber, and the methods of calculation involved in judging the value of forests and forest operations. Lectures and field work.—*Two hours, first semester.*

6. Forest Management.

Continuation of Course 5.—*Two hours, second semester.*

Courses 5 and 6 are open only to Forestry students.

Mr. C. A. DAVIS:—

7. Dendrology.

Monographic study of forest trees: their life history, distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory and field work.—*Three hours, second semester.*

Open only to students in Forestry.

8. Timber Physics.

The study of the structure, distinctive characteristics and technical properties of our common woods and the relation of these properties to the principal uses of timber. Lectures and laboratory work.—*Three hours, first semester.*

Open only to students in Forestry.

ANATOMY AND HISTOLOGY.

Professors McMURRICH and HUBER:—

1. Anatomy of the Central Nervous System.

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have taken anatomy Course 4 or an equivalent.—*Three hours, first or second semester.*

2. Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in histology.—*Hours to be arranged with the instructor, throughout the year.*

3. Anatomical Research.**4. Histological Research.**

These courses are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY.

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a *minor for the master's degree* is five hours of lectures the first semester, three hours the second semester, a laboratory course of five afternoons a week for eight weeks, the second semester, and a report on the literature of some limited subject. No research work will be required, except from those who have already taken advanced work in physiology. The requirements for a *major for the master's degree* includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirement for a *minor for the doctor's degree* involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a *major for the doctor's degree* is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, biology, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research, under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; three hours a week, second semester.

Laboratory Course.

Five afternoons a week, half of one semester.

Research Work

Hours to be arranged with instructor.

PUBLISHED BY THE UNIVERSITY OF MICHIGAN AS FREQUENTLY AS
FOUR TIMES A YEAR IN ACCORDANCE WITH THE PROVISIONS OF THE
ACT OF CONGRESS OF JULY 16, 1894.

CATALOGUE OF STUDENSS, 1902-1903.

NAME.	RESIDENCE.
Royal Albert Abbott, Ph.B., <i>Ohio State University</i> , 1900, A.M., <i>ibid.</i> , 1902, Rhetoric; English Literature; Aesthetics.	<i>Columbus, O.</i>
Mary Davidson Agnew, A.B., <i>Albion Coll.</i> , 1899, Latin; German; Roman Political Antiquities.	<i>Chesaning.</i>
Kakujiro Akamatsu, A.B., 1901, Finance; Political Economy; History.	<i>Tokyo, Japan.</i>
Leila Ruth Albright, A.B., <i>Vassar College</i> , 1901, American History; European History; Political Philosophy.	<i>Detroit.</i>
Louis Bennett Austin, Ph.B., <i>Hillsdale College</i> , 1897, Ph.M., <i>ibid.</i> , 1900, Physics; Sound and Light; Physical Chemistry.	<i>Hillsdale.</i>
Ellen Botsford Bach, A.B., 1901, Botany; Plant Physiology; Invertebrate Zoology.	<i>Ann Arbor.</i>
Ella May Baldwin, A.B., 1902, German; French; Pedagogy.	<i>Flint.</i>
Frederick Amos Baldwin, M.D., 1898, A.B., 1902, Bacteriology; Physiological Chemistry; Organic Chemistry.	<i>Ann Arbor.</i>
Julius Earle Barton, A.B., 1902, Forestry; Botany; German.	<i>Detroit.</i>
Ernest Sutherland Bates, A.B., 1902, Rhetoric; Aesthetics; English Literature.	<i>Cleveland, O.</i>
Robert Louis Benson, A.B., 1902, Physical Chemistry; Analytical Chemistry; Physics.	<i>Mount Morris.</i>
Harriet Williams Bigelow, A.B., <i>Smith College</i> , 1893, Practical Astronomy; Theoretical Astronomy; Physics.	<i>Utica, N. Y.</i>
Frank Arthur Bohn, Ph.B., <i>Ohio State Univ.</i> , 1900, A.M., <i>ibid.</i> , 1901, <i>Holder of the Peter White Fellowship in American History</i> , American History; European History; Political Science.	<i>Olmsted Falls, O.</i>
William Edward Bohn, A.B., <i>German Wallace College</i> , 1899, A.M., <i>Ohio State University</i> , 1900, Rhetoric; English Literature; Aesthetics.	<i>Ann Arbor.</i>
James Bond, A.B., <i>Knox College</i> , 1902, European History; American History; Sociology.	<i>Galesburg, Ill.</i>
Harold Prell Breitenbach, A.B., 1901, English Literature; Rhetoric; Greek.	<i>Detroit.</i>
Forest Buffen Harkness Brown, A.B., 1902, Forestry; Systematic Botany; Ecology.	<i>Ypsilanti.</i>
Charles Sumner Bush, A.B., 1902, Commerce and Industry; Political Economy; Commercial Law.	<i>Battle Creek.</i>

*The principal subjects of study pursued by candidates for an advanced degree are indicated under their respective names; the subject first named being the major study.

- Kenyon Leech Butterfield, B.S., *Michigan Agricultural College*, 1891, A.M., 1902, *Ann Arbor*.
Sociology; Political Economy; History of Education.
- Lotta Elizabeth Clark, A.B., *Ripon College*, 1901, *Ripon, Wis.*
Latin; Greek; Roman Political Antiquities.
- Lee Holt Cone, B.S., *Pomona College*, 1901, *Santa Ana, Cal.*
Organic Chemistry; Physical Chemistry; Physics.
- Seymour Beach Conger, A.B., 1900, *Grand Rapids*.
Political Economy; American History; Political Science.
- Edward Samuel Corwin, Ph.B., 1900, *Plymouth*.
American History; European History; Sociology.
- George Herbert Curtis, A.B., *Albion Coll.*, 1899, *Williamston*.
Physics; Analytical Chemistry; Mathematics.
- Harvey Lincoln Curtis, Ph.B., 1900, *Dansville*.
Physics; Mathematics; Analytical Chemistry.
- Jean Dawson, A.B., 1902, *Caro*.
Embryology; Botany; Zoology.
- Robert Peter DeBruyn, A.B., *Hope College*, 1898, *Holland*.
Latin; Roman Political Institutions; History.
- Maud Mary DeWitt, B.S., 1900, *Ann Arbor*.
Experimental Physiology; Embryology; Botany.
- Carl Conrad Eckhardt, Ph.B., *Ohio State University*, 1902, *Toledo, O.*
European History; American History; American Literature.
- Ralph Henry Elsworth, A.B., 1902, *Ann Arbor*.
Commerce and Industry; Political Economy; Sociology.
- Herbert William Emerson, Ph.C., 1901, B.S., 1902, *Holder of the Parke, Davis & Co. Fellowship in Chemistry*, *Burlington, Ont.*
- Jennie Deyarmon Fisher, Ph.B., *DePauw University*, 1902, *Steubenville, O.*
German; Latin; Roman Political Institutions.
- Louise French, Ph.B., *Univ. of Wooster*, 1899, *Lake Forest, Ill.*
Latin; English Literature; Roman Political Institutions.
- Maurice Garland Fulton, Ph.B., *University of Mississippi*, 1898, A.M., *ibid.*, 1901, *University, Miss.*
Rhetoric; English Literature; Aesthetics.
- Charles Edwin Galloway, A.B., 1902, *Fond du Lac, Wis.*
Psychology; Philosophy; Zoology.
- Louis Merwin Gelston, A.B., 1901, *Ann Arbor*.
Bacteriology; Organic Chemistry; Sanitary Science.
- Sarah Eleanor Gibson, A.B., 1902, *Hagerstown, Md.*
- Ralph Stillman Garwood, A.B., 1892, *Marshall*.
Latin; Roman Political Institutions; Greek.
- Martha Nathalie Greiner, Ph.B., 1900, *Ann Arbor*.
German Literature; Germanic Philology; French.
- Leonard Dixon Haigh, B.S., 1900, *Port Huron*.
Organic Chemistry; Analytical Chemistry; Physics.
- Clifford LeRoy Hare, M. S., *Alabama Polytechnic Institute*, 1892, *Auburn, Ala.*
Metallurgy; Physical Chemistry; Organic Chemistry.
- Edwin Andrew Hayden, B.S., *University of Wisconsin*, 1894, *Union City*.
Sociology; Psychology; Political Economy.

- Wilbur Olin Hedrick, B.S., *Michigan Agricultural College*, 1891, M.S., 1895, *Agricultural College*.
 Political Economy; Finance; Sociology.
 George Oswin Higley, A.B., 1891, M.S., 1893, *Ann Arbor*.
 Inorganic Chemistry; Physics; Mineralogy.
 Arthur Joseph Hoare, A.B., 1900, A.M., 1902, *Elk Rapids*.
 Latin; Mathematics; Greek.
 Richard Dennis Teall Hollister, A.B., 1902, *Ann Arbor*.
 Oratory; English; Pedagogy.
 Frank Sylvester Honberger, A.B., 1902, *Toledo, O.*
 Analytical Chemistry; Chemical Technology; Mineralogy.
 Frederick Charles Irwin, B.S., 1895, *Detroit*.
 Analytical Chemistry; Physical Chemistry; Physics.
 Charles Willis Johnson, Ph.C., 1896, B.S. [Phar.], 1900, *Ann Arbor*.
 Organic Chemistry; Analytical Chemistry; Pharmacognosy.
 Dora Ione Keller, A.B., 1902, *South Bend, Ind.*
 German; American History; English Literature.
 Daniel Kennedy, A.B., *Holy Cross Coll.*, 1900, *Pawtucket, R. I.*
 English Literature; Rhetoric; Aesthetics.
 Mortimer Bailey Kennedy, A.B., 1902, *Peoria, Ill.*
 Analytical Chemistry; Chemical Technology; Mineralogy.
 Blanche Louise King, A.B., *Olivet Coll.*, 1899, *Romeo*.
 Latin; Greek; Roman Political Institutions.
 Adele Louise Klein, A.B., 1901, A.M., *Columbia University*, 1902, *Detroit*.
 German; French; English.
 Adoniram Judson Ladd, A.B., 1894, A.M., 1900, *Ann Arbor*.
 Pedagogy; Philosophy; Psychology.
 Mary Frances Leach, B.S., 1893, *Fellow in Physiological Chemistry*, *Detroit*.
 Physiological Chemistry; Hygiene; Organic Chemistry.
 Louise Mueller Lenhart, A.B., 1902, *Bridgman*.
 German; History; Sociology.
 David J. Levy, A.B., 1902, *Holder of Rockefeller Scholarship in Bacteriology*, *Kalamasoo*.
 Bacteriology; Physiological Chemistry; Physical Chemistry.
 Frank Myers Longanecker, A.B., *Hiram College*, 1899, *Hiram, O.*
 Greek; Latin; Roman Political Institutions.
 Mary Lowell, A.B., 1901, *Holder of the Pilgrim Fellowship in Rhetoric and English Composition*, *Union City*.
 Rhetoric; Aesthetics; English Literature.
 Samuel Denis Magers, B.S., 1894, M.S., *University of Chicago*, 1901, *Ypsilanti*.
 Physiology; Bacteriology; Botany.
 Mark Marshall, B.S., *Earlham College*, 1902, *Richmond, Ind.*
 Zoology; Embryology; Botany.
 Stephen Ivan Miller, Jr., LL.B., 1896, A.B., *Pontiac*.
 Leland Stanford, Jr., *University*, 1898, Political Economy; Sociology; Political Science.
 Howard Daniel Minchin, B.S., 1899, *Detroit*.
 Physics; Mathematics; Physical Chemistry.

- Charles Rufus Morey, A.B., 1899, A.M., 1900,
Holder of the Buhl Classical Fellowship
(studying in Rome),
Archaeology; Greek; Latin. Charlotte.
- Clarence Burton Morrill, B.L., 1900,
English Literature; Rhetoric; Aesthetics. Ann Arbor.
- Helen Elizabeth Munger, A.B., *Earlham College*,
1901, Burtonville, Ind.
English Literature; Rhetoric; Pedagogy.
- Joseph Raleigh Nelson, A.B., 1894, Chicago, Ill.
Latin; Roman Political Institutions; Rhetoric.
- Genevieve Delony O'Neill, A.B., 1901, Macatawa.
French; English Literature; Spanish.
- Oliver Winfred Perrin, A.B., 1901, Ypsilanti.
English Literature; Rhetoric; Mathematics.
- Frank Fraser Potter, A.B., 1902, Mount Pleasant.
English Literature; Greek; Latin.
- Mary Lucy Probasco, B.S., *Illinois Wesleyan*
University, 1902, Bloomington, Ill.
Flora Prowdley, Ph.B., 1898, Dowagiac.
English Literature; American Literature; Rhetoric.
- Mary Burnham Putnam, Ph.B., 1885, Ypsilanti.
- Luella Jane Read, B.L., *Tabor College*, 1898,
A.B., 1902, Shenandoah, Ia.
History; English Literature; Rhetoric.
- Candace Wilcox Reynolds, Ph.B., *Olivet College*,
1897, Olivet.
- Charles Frederick Curtis Riley, A.B., *Doane*
College, 1901, Crete, Neb.
Vertebrate Zoology; Invertebrate Zoology; Botany.
- William Rinck, A.B., *Hope College*, 1900, A.B.,
1901, Holland.
Mathematics; Physics; German.
- John Clifford Roberts, A.B., *Penn College*, 1900, Oskaloosa, Ia.
Latin; Roman Political Institutions; German.
- Annie Laurie Rooney, Ph.B., 1894, Menominee.
English Literature; Rhetoric; French.
- Philip Louis Schenk, A.B., 1902, *Holder of the*
Stearns Fellowship in Music, Ann Arbor.
Music; Greek; Latin.
- Alfred Diehl Schoch, B.S., *Pacific Univ.*, 1900, Forestgrove, Ore.
- John William Scholl, A.B., 1901, A.M., 1902, Ann Arbor.
German Literature; Germanic Philology; General Linguistics.
- Hanji Shimotome, *Tokyo Polytechnic Institute*,
1895, 'wqoq'okqo J
Organic Chemistry; Chemical Technology; Metallurgy.
- Harrison Standish Smalley, A.B., 1900, Ann Arbor.
Political Economy; Finance; Jurisprudence.
- Warren Hadley Smith, Ph.B., 1889, Ypsilanti.
Political Economy; Sociology; Pedagogy.
- John Samuel Staudt, A.B., *Franklin and Mar-*
shall College, 1901, Lower Heidelberg,
Physics; Chemistry; Mathematics.

- Frederick Tyndall Swan, A.B., 1897, A.M., 1898, *Potsdam, N. Y.*
 Latin; Greek; Roman Political Institutions.
- Joseph Morris Thomas, Ph.B., 1898, *Ann Arbor.*
 English Literature; Rhetoric; Aesthetics.
- Harry Conrad Thurnau, A.B., 1899, *Charlotte.*
 German Literature; Germanic Philology; English Literature.
- Edgar Nelson Transeau, A.B., *Franklin and Marshall College*, 1897, *Holder of the Dexter M. Ferry Botanical Fellowship*, *Colorado Springs, [Col.]*
 Botany; Plant Physiology; Geology.
- Alonzo Hubert Tuttle, A.B., 1896, *Decatur, Ill.*
 Administrative Law; Jurisprudence; American History.
- Ada Maude Vickers, A.B., 1900, *Paola, Kan.*
 Latin; English Literature; Roman Political Institutions.
- George Wagner, Ph.C., 1893, A.B., *University of Kansas*, 1899, *Lawrence, Kan.*
 Zoology; Plant Physiology; Psychology.
- Bertha Coolidge Wetherbee, A.B., *Wellesley College*, 1899, *Detroit.*
 English Literature; Sociology; American History.
- May Wheeler, A.B., 1901, *Holder of Rockefeller Scholarship in Hygiene*, *Indianapolis, Ind.*
 Physiological Chemistry; Bacteriology; Sanitary Science.
- Robert Isaac White, A.B., *Albion College*, 1902, *Ann Arbor.*
 European History; American History; Comparative Constitutional History.

The following student, enrolled in the Department of Medicine and Surgery, is also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

- Ward J. MacNeal, A.B., 1901, *Fenton.*
 Bacteriology; Organic Chemistry; Sanitary Science.

CANDIDATES FOR A MASTER'S DEGREE STUDYING IN ABSENTIA.

NAME.	RESIDENCE.
John Quincy Adams, B.L., 1894, LL.B., 1898, Oratory; English.	<i>Lancaster, Pa.</i>
George Washington Furrey, Ph.B., 1899, Mathematics; Physics; Mechanics.	<i>Mount Morris, Ill.</i>

NAMES.	RESIDENCE.
†Edith Christena Carter, A.B., 1903, Rhetoric; English Literature; European History.	<i>Decatur, Ill.</i>
†Edith Louise DeLong, A.B., 1903, Æsthetics; Rhetoric; English Literature.	<i>Dayton, Ohio.</i>
†Lena Mabel Foote, A.B., 1903, Latin; Greek; English,	<i>Charlotte.</i>
†William D. Henderson, A.B., 1903, Physics; Physical Chemistry; Psychology.	<i>Petoskey.</i>
†Genevieve Imus, A.B., 1903, Organic Chemistry; Physical Chemistry; English.	<i>Ann Arbor.</i>
†Samuel Bovyer Laird, A.B., 1903, Psychology; Pedagogy; History of Philosophy.	<i>Ypsilanti.</i>

†Schuyler Colfax McAlpine, A.B., 1903, Inorganic Chemistry; Organic Chemistry; Physics.	<i>Peoria, Ill.</i>
†Claude Irwin Palmer, A.B., 1903, Mathematics; Mechanics; Physics.	<i>Ann Arbor.</i>
†James Herbert Russell, A.B., 1903, American History; European History; Sociology.	<i>Indiana, Pa.</i>
†Hetty Mary Taylor, A.B., 1903, Latin; English Literature; Rhetoric.	<i>Bay City.</i>
†Herbert Hunter Vaughan, A.B., 1903, French; Middle High German; Italian.	<i>Ann Arbor.</i>
†Mary Alice Whitney, A.B., 1903, American History; European History; Political Economy	<i>Emporia, Kansas.</i>
†Rose May Whitney, A.B., 1903, American History; English; Sociology.	<i>Battle Creek.</i>

A dagger (†) indicates that the student was admitted to the Graduate School at the beginning of the second semester, on completion of the requirements for the bachelor's degree, though the degree was not to be conferred until the end of the year.

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UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

GRADUATE SCHOOL

ANNUAL ANNOUNCEMENT

FOR

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ANN ARBOR
PUBLISHED BY THE UNIVERSITY
1904

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DEPARTMENT OF LITERATURE, SCIENCE,
AND THE ARTS

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1904

CALENDAR.

1904.

- Sept. 27. FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY.
- Nov. — Thanksgiving Recess of three days, beginning Tuesday evening, in all Departments of the University.
- Dec. 22. (Evening) Holiday Vacation begins in all Departments.

1905.

- Jan. 10. Exercises resumed.
- Feb. 10. (Evening) FIRST SEMESTER CLOSES.
- Feb. 13. SECOND SEMESTER BEGINS.
- April 14. (Evening) Recess begins, ending April 24 (evening).
- June 22. COMMENCEMENT IN ALL DEPARTMENTS OF THE UNIVERSITY.

ADMINISTRATIVE COUNCIL.

JAMES B. ANGELL, LL.D., *President.*

ALBERT B. PRESCOTT, M.D., LL.D., *Director of the Chemical Laboratory, and Professor of Organic Chemistry.*

REV. MARTIN L. D'OUGE, LL.D., *Professor of the Greek Language and Literature.*

WILLIAM H. PETTEE, A.M., *Professor of Mineralogy, Economic Geology, and Mining Engineering.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

ALBERT H. PATTENGILL, A.M., *Professor of Greek.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory.*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory.*

*VOLNEY M. SPALDING, PH.D., *Professor of Botany.*

HENRY C. ADAMS, LL.D., *Professor of Political Economy and Finance.*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts.*

ALBERT A. STANLEY, A.M., *Professor of Music.*

FRANCIS W. KELSEY, PH.D., *Professor of the Latin Language and Literature.*

OTIS C. JOHNSON, PH.C., A.M., *Professor of Applied Chemistry.*

PAUL C. FREER, PH.D., M.D., *Professor of General Chemistry and Director of the Laboratory of General Chemistry.*

*ANDREW C. McLAUGHLIN, A.M., LL.B., *Professor of American History.*

ASAPH HALL, JR., PH. D., *Professor of Astronomy and Director of the Observatory.*

ISRAEL C. RUSSELL, C.E., LL.D., *Professor of Geology.*

WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology.*

JACOB REIGHARD, PH.B., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum.*

* Absent on leave.

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory.*

JAMES A. CRAIG, PH.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek.*

J. PLAYFAIR McMURRICH, PH.D., *Professor of Anatomy.*

ROBERT M. WENLEY, Sc.D., LL.D., *Professor of Philosophy.*

GEORGE HEMPL, PH.D., *Professor of English Philology and General Linguistics.*

ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages.*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching.*

FRED N. SCOTT, PH.D., *Professor of Rhetoric.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

FREDERICK G. NOVY, Sc.D., M.D., *Professor of Bacteriology.*

EDWARD D. CAMPBELL, B.S., *Professor of Analytical Chemistry.*

ALLEN S. WHITNEY, A.B., *Professor of Pedagogy.*

FILIBERT ROTH, B.S., *Professor of Forestry.*

G. CARL HUBER, M.D., *Professor of Histology and Embryology.*

FRED M. TAYLOR, PH.D., *Professor of Political Economy and Finance.*

ALEXANDER ZIWET, C.E., *Professor of Mathematics.*

GEORGE W. PATTERSON, JR., PH.D., *Junior Professor of Electrical Engineering.*

FREDERICK C. NEWCOMBE, PH.D., *Junior Professor of Botany.*

JOHN O. REED, PH.D., *Junior Professor of Physics.*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy, and Secretary of the Administrative Council.*

JOSEPH H. DRAKE, PH.D., LL.B., *Junior Professor of Latin and Roman Law.*

MORITZ LEVI, A.B., *Junior Professor of French.*

WALTER DENNISON, PH.D., *Junior Professor of Latin.*

EARL W. DOW, A.B., *Junior Professor of History.*

MOSES GOMBERG, Sc.D., *Junior Professor of Organic Chemistry.*

LEWIS B. ALGER, PH.B., *Junior Professor of Pedagogy.*

JOSEPH L. MARKLEY, PH.D., *Junior Professor of Mathematics.*

CHARLES H. COOLEY, PH.D., *Junior Professor of Sociology.*

GEORGE REBEC, PH.D., *Junior Professor of Philosophy.*

EDWARD D. JONES, PH.D., *Junior Professor of Commerce and Industry.*

S. LAWRENCE BIGELOW, PH.D., *Assistant Professor of General Chemistry.*

ANNOUNCEMENT

OF THE

GRADUATE SCHOOL.

GENERAL INFORMATION.

The University of Michigan.

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental Announcement. In the several faculties there were in 1903-1904, 176 officers of instruction, besides numerous assistants, some of whom participated in the work of teaching. Including the Summer Schools, about 3,955 students, representing 50 States and Territories, and 14 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts.

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1903-1904, 111 regular teachers and 44 assistants. The students in attendance numbered over 1,420, of whom 104 were graduates. The presence of such a number of graduate students, taken with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Libraries.

The various libraries of the University contain about 175,000 volumes, and include a number of important special collections. Among these are the McMillan Shakespeare Library, 5,263 volumes; the Parsons Library (political science), 6,076 volumes; the Goethe

Library of about 1,037 volumes; and the Morris Library (philosophy), 1,100 volumes. The general reading room seats 300 readers and separate rooms are provided for advanced students to work in, with the necessary books close at hand. Under certain restrictions graduate students have access to the book rooms. The library takes 1,070 periodicals, and is open, in term time, fourteen hours daily, except on Sundays and legal holidays. During the summer vacation it is open nine hours a day during the summer session, and six hours a day for the remainder of the time.

The Laboratories.

The University has an observatory and a large number of laboratories more or less fully equipped for routine instruction and for original research. The laboratories (omitting those connected exclusively with the work of the Engineering, Medical, and Dental Schools) are: the Anatomical, Botanical, Chemical, Geological, Histological, Forestry, Hygienic, Physical, Physiological, Psychological, and Zoological. For a fuller account of them and their various resources, as also of the University collections for the study of art, archæology, ethnology, mineralogy, palæontology, systematic zoology, etc., consult the annual Calendar, which may be had *gratis* on application to Mr. James H. Wade, Secretary of the University.

Societies.

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews or recent literature, etc.

ORGANIZATION OF GRADUATE WORK.

The Graduate School.

The Graduate School was organized in the Spring of 1892 in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department—courses that have developed during the past few years from the continual extension of the elective system,—and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration

of the higher work, and, so far as possible, for the separate instruction of graduate students. It also aims to lay foundations for the future development of university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council, of which the President of the University is chairman.

The regulations of the University respecting graduate work that were formerly in force, have been modified in a few particulars by the Council, and it is possible that still further changes may be made in the year to come. The more important of these regulations are explained in the pages that follow.

The University System.

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of an original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a *master's* degree. It may be added also that for the *master's* degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Graduate students who do not wish to work for a higher degree are admitted to any course offered in the Department of Literature, Science, and the Arts, upon satisfying the professor in charge that they are qualified to pursue the work to advantage.

THE HIGHER DEGREES.

Degrees Conferred.

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees.

A Bachelor of this University, or of any other reputable university or college, may become a candidate for a master's degree, and may be recommended for the degree after one year's residence at the University, provided he pass a satisfactory examination on the course of study approved by the Administrative Council. A thesis may, or may not, be included in the requirements for a degree, as the committee in charge of the student's work may determine.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The practice of allowing graduates of this University to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.*

A student properly qualified may be permitted to pursue at the same time studies for a master's degree and studies in any of the professional schools, on condition that the term of study and residence in the Graduate School be extended to cover at least two years.

The Doctors' Degrees.

1. The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research. The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Doctor of Science.

2. It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study, and no definite term of required residence can be specified. As a rule, three years of graduate study will be necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened

in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work.

3. No student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. [This rule may be waived in the case of those who come properly accredited from a Graduate School of some other university, and of those who, as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.]

4. A student wishing to become a candidate for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

5. A candidate for a doctor's degree must take a major study that is substantially co-extensive with some one department of instruction in the University. He must also take two minor studies, one of which may be in the same department as the major, but involving a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council.

6. THE THESIS.—The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but it must depend for acceptance more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

Special Regulations Relating to the Higher Degrees.

1. Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within one week after the opening of the semester*, the particular branches of study to which they wish to give special attention.* The supervision of their work will then be entrusted to the proper committee.

2. The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

* See also next page under "Admission and Registration."

3. The thesis must be completed and put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

4. The thesis must be prepared for close scrutiny with reference not only to its technical merits, but also to its merits as a specimen of literary workmanship. It must be preceded by an analytical table of contents, and a carefully prepared account of the authorities used.

5. The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

6. Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of his thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. He is also required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee. To guarantee the printing of the thesis, every candidate for the doctor's degree is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended.

ADMISSION AND REGISTRATION.

All applicants for admission to the Graduate School must first report to the Dean of the Department of Literature, Science, and the Arts, and present their credentials. They will then receive special blanks to be filled out, subject to the approval of the professors under whom they wish to work, and they should consult with these professors at once, in order, if possible, to report to the Secretary of the Administrative Council not later than one week after the opening of the semester. The Secretary can be found at his office in University Hall during the first week of each semester *daily*, between 12 and 1, and throughout the year *Tu.* and *Th.* at 12.

The privileges of the school are open to graduates of the Department of Literature, Science, and the Arts of this University, and to

graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School.

Graduates of institutions where the undergraduate courses of study are not substantially equivalent to the course prescribed at this University, are ordinarily required to do an additional amount of undergraduate work, or to prolong their term of residence, before being admitted to full candidacy for a higher degree.

Graduates of this University, or of other institutions, who do not wish to become candidates for a degree, may be admitted and registered as special resident graduates.

Graduates of other institutions who are candidates for a bachelor's degree in the Department of Literature, Science, and the Arts, are not registered in the Graduate School.

Students already admitted to the Graduate School must report to the Secretary of the Council within two weeks after the beginning of the academic year, if they wish to continue their studies.

FEES AND EXPENSES.

Matriculation Fee.—Every student, before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or graduate shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for the materials and apparatus actually consumed by them. The deposits required in advance are different in the different courses, ranging from one to twenty dollars. The laboratory expenses of students will vary with their prudence and economy. Experience has shown that in the chemical laboratory the average expense for all courses is about one dollar and twenty cents a week.

Diploma Fee.—The fee for the diploma given on graduation is ten dollars, and the by-laws of the Board of Regents prescribe that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

FELLOWSHIPS.

Elisha Jones Classical Fellowship.

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University, in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President ANGELL, and Professors D'OUGE, KELSEY, HUDSON, and PATTENGILL. The period of incumbency is limited to two academic years, and must be spent at this University "unless at any time the examining board shall see fit to allow the second year to be spent" at some other place favorable to classical study.

No income has been available for the current year.

Fellowship in Chemistry.

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1903-1904 of the Fellowship in Chemistry established by them in 1895. Professors VAUGHAN, PRESCOTT, and FREER were designated to act as a committee to select the incumbent and to arrange the work in accordance with the wishes of the donors. The holder of the Fellowship for the year 1903-1904 has been William H. Lightstone, Jr., A.B.

Peter White Fellowship.

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1903-1904 by Honorable Peter White, of Marquette. The holder of the Fellowship for the year has been Frank Arthur Bohn, A.M.

Dexter M. Ferry Botanical Fellowship.

Provision for a Fellowship in Botany, with an income of five hundred dollars, was continued for the year 1903-1904 by Mr. Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year has been Edgar Nelson Transeau, A.B.

Stearns Fellowship.

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars. The holder of the Fellowship for 1903-1904 has been Johannes Korselt, Ph.D., Chem. Eng.

Gas Engineering Fellowship.

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of a Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for special apparatus and material required for the research. The holder of the Fellowship for the year has been Samuel Ball.

Buhl Classical Fellowship.

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1903-1904. The joint holders of the Fellowship for the year have been Henry Herbert Armstrong, A.M., and Robert Byrns English, A.B.

Stearns Fellowship in Music.

By the generosity of Mr. Frederick Stearns, of Detroit, provision for a Fellowship in Music, with an income of four hundred dollars, has been continued for the year 1903-1904. The holder of the Fellowship for the year has been Philip Louis Schenk, A.B.

Rockefeller Fellowships.

The Rockefeller Institute for Medical Research has continued its grant for two fellowships in Hygiene and Bacteriology for the year 1903-1904. The holders of these fellowships for the year have been Ward J. MacNeal, A.B., and Harro Woltmann.

Angeline Bradford Whittier Fellowship in Botany.

This Fellowship has been established by Joseph Bradford Whittier, of Saginaw, in memory of his mother. The principal sum of the endowment is four thousand dollars. No income has been available for the current year.

Ford Fellowship in Physiological Chemistry.

This Fellowship has been supported for the year 1903-1904 by the generosity of an anonymous contributor. The holder has been Mary Frances Leach, Ph.D.

Vaughan Fellowship in Hygiene.

This Fellowship has been supported for the year 1903-1904 by the generosity of an anonymous contributor. The holder has been May Wheeler, Ph.D.

COURSES OF INSTRUCTION

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates. Different departments of instruction have adopted different modes of announcing the work. *For further information reference may be made directly to the head of the department concerned.*

GREEK.

The courses here announced presuppose, in general, four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Lysias, Xenophon, Homer, Demosthenes, the Tragic Poets, and Aristophanes.

FIRST SEMESTER.

Professor D'OUGE:—

Teachers' Course.

Lectures on Greek Grammar, particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week.*

[Seminary in Tragedy.

Studies in Sophocles, with special reference to the dramatic art of the poet, his use of meters and the antiquities of the Greek stage.—*Three hours a week.*

Omitted in 1904-1905; to be given in 1905-1906].

The Oresteian Trilogy of Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet.—*Three hours a week.*

The History of Greek Art from the Beginning to the Roman Period.

Gardner's Handbook of Greek Sculpture and Tarbell's History of Greek Art will be made the basis of a more general study.—*Three hours a week.*

Plato and Aristotle.

Selections from the Gorgias and from the Nicomachean Ethics.—*Two hours a week.*

Professor PATTENGILL:—

[Herodotus. Books VI and VII.

Three hours a week.

Omitted in 1904-1905; to be given in 1905-1906].

Thucydides and a Study of the Peloponnesian War.

Three hours a week.

Assistant Professor SANDERS:—

'Greek Epigraphy.

A study of the local alphabets, and exercises in reading inscriptions.—*Two hours a week.*

SECOND SEMESTER.

Professor D'OUGE:—

Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.—*Three hours a week.*

[Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week.*

Omitted in 1904-1905; to be given in 1905-1906].

[Seminary in Plato's Republic.*Two hours a week.*

Omitted in 1904-1905; to be given in 1905-1906].

[Lucian.Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week.*

Omitted in 1904-1905; to be given in 1905-1906].

Modern Greek.A practical introduction and practice in reading specimens of modern Greek literature.—*Three hours a week.***Aristotle's Athenian Constitution.**With special reference to the judicial and political antiquities of Athens.—*Two hours a week.***[Lectures on Ancient Greek Life.**Illustrated by means of stereopticon.—*One hour a week.*

Omitted in 1904-1905; to be given in 1905-1906].

Professor PATTENGILL:—**The Bucolic Poets. The Idyls of Theocritus, Bion and Moschus.***Three hours a week.***[Aristophanes. Rapid Reading Course.***Three hours a week.*

Omitted in 1904-1905; to be given in 1905-1906].

Assistant Professor SANDERS:—**Greek Palæography.***Two hours a week.***Dr. STUART:—****Greek Prose Composition.**This course is intended for those who are preparing to teach Greek.—*Two hours a week.***LATIN.**

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the Uni-

versity collections of classical antiquities and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museums of Rome and Naples.

4. Casts of ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have lately been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 300 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmäler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Professor KELSEY:—

Latin Seminary: Roman Satire, with Special Study of Juvenal.

Open to graduate students only.—*Two hours a week, throughout the year.*

Juvenal.

Interpretations and lectures.—*Two hours a week, first semester.*

[Roman Art, as studied in the Monuments.

General introduction to Roman Archæology; lectures on Roman architecture, sculpture, and painting. This course will be illustrated by photographs, engravings, and stereopticon slides, with occasional lectures upon the casts in the Art Gallery.—*Three hours a week, second semester.*

This course will be omitted in 1904-1905].

The Topography and Monuments of the City of Rome.

Lectures. illustrated by photographs, engravings, and stereopticon slides.—*Three hours a week, second semester.*

The Antiquities of Pompeii.

Illustrated lectures, summarizing the results of excavation and research at Pompeii as contributing to our knowledge of Greek and Roman art and life.—*One hour a week, first semester.*

Professors KELSEY and DENNISON:—

Caesar's Gallic War (Teachers' Course, A).

Lectures. Papers prepared by those taking this course. Critical study of the text of the Gallic War, on the basis of Meusel's edition; studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical study of the Bucolics, and selected portions of the Georgics, Aeneid, and Appendix Vergiliana, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DRAKE:—

The Germania and Agricola of Tacitus.

Interpretations and lectures.—*Two hours a week, first semester.*

Roman Literature.

Interpretation of selections from representative authors, from Ennius to Boethius; lectures.—*Four hours a week, first semester.*

General Course in Roman Literature.

Lectures and Topical Studies. This course is designed for students interested in the general subject of literature, who do not wish to make an intensive study of Latin. No knowledge of Latin is required. The Roman literature will be treated in its broad relations to the Greek literature and to modern literature.—*Two hours a week, first semester.*

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparisons.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law as given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, second semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

Professor DRAKE and Dr. MEADER:—

Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Professor DENNISON:—

Latin Inscriptions.

Reading of inscriptions of different periods from the De Criscio collection and from reproductions. Interpretation of selected inscriptions.—*Two hours a week, second semester.*

Martial; Petronius, Trimalchio's Banquet.

With special reference to the private and social life of the Romans.—*Two hours a week, first semester.*

[The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century.—*Two hours a week, first semester.*

This course will be omitted in 1904-1905].

[The Letters of Cicero.

Interpretation of selected letters, with special reference to Roman manners and political conditions at the end of the Republic.—*Two hours a week, first semester.*

This course will be omitted in 1904-1905].

The Private Life of the Romans.

Lectures on Roman life and the social conditions of antiquity; illustrated by stereopticon slides.—*One hour a week, first semester.*

Professor DENNISON, Assistant Professor SANDERS, and Dr. MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Catullus, Tibullus, and Propertius.

Interpretations, with lectures on the Roman elegy.—*Three hours a week, second semester.*

Assistant Professor SANDERS and Dr. MEADER:—

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Dr. MEADER:—

[The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

This course will be omitted in 1904-1905].

[The Pseudo-Cæsarian Bellum Africanum and Bellum Hispaniense.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1904-1905].

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

SANSKRIT AND COMPARATIVE LINGUISTICS.

Before beginning the study of Sanskrit, the student should have pursued courses in two of the three subjects, Greek, Latin, and German for at least four semesters. The courses in Comparative Linguistics are open to students of modern as well as of ancient languages.

Dr. MEADER:—

Beginners' Course.

Grammar, and exercises in translation and composition. Text-books: Whitney's Grammar and Lanman's Sanskrit Reader.—*Two hours a week, first semester.*

Advanced Courses.

A. Interpretation of the selections contained in Lanman's Sanskrit Reader, with elementary studies in the comparative morphology of the more important cognate languages.—*Two hours a week, second semester.*

B. Advanced Reading: Kalidasa's Cakuntala. Elements of Prakrit.—*One hour a week, first semester.*

[C. Advanced Reading: Selections from the Vedas.—*One hour a week, second semester.* This course is omitted in 1904-1905].

Comparative Linguistics.

A general introduction to comparative Indo-European and classical philology. Study of the relationships, classification and general characteristics of the Indo-European languages, and discussion of the main questions of comparative phonology, morphology and syntax. *A knowledge of Sanskrit is not required.* Lectures and recitations.—*One hour a week, throughout the year.*

SEMITICS.

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of "classical" and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

Professor CRAIG:—

Hebrew.*

1. Genèsis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

2. Deuteronomy,

Joshua, I Samuel, Ruth, Jonah. Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

3. Prophetic Literature:

Amos and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

4. The Book of Job,

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

Assyrian.

1. Introduction to Easy Historical Inscriptions

From the Ninth Century B. C., with study of the grammar Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

2. Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Second semester.*

3. The Babylonian Stories of Creation,

The Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians. Inscription of Tiglath-pileser, I, circa 1120 B. C.—*Two hours a week, first semester.*

4. Religious Literature.

King's "The Prayers of the Lifting-up of the Hand." Craig's "Religious Texts."—*Second semester.*

History and Archæology.

(1) Lectures on the Ancient Babylonians, Assyrians, Hebrews, Phoenicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

(2) Lectures on the History of Israel and Judah

From earliest times to the Reformation of Ezra.

(3) Lectures. Introduction to the Study of the Old Testament.

(4) Lectures. Study of the Prophetic Books of the Old Testament.

(5) Special Lectures. See Literary Announcement for 1904-1905.

Arabic.

1. Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

2. Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

Aramaic, Syriac, Ethiopic.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

Hellenistic Greek.

Professor CRAIG:—

New Testament.

The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

Septuagint.

I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

FRENCH.

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1903-1904.

Professor CANFIELD:—

Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discus-

sions. Open to undergraduates and graduates.—*Three hours a week, first semester.*

The Growth of Realism in the Nineteenth Century, Especially in the Novel.

This course involves a study of the transition from Romanticism to Realism, of the relation of Realism to the preceding movement, and of the influences that contributed to its ascendancy. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Three hours a week, second semester.*

Proseminary in French Literature.

Special topics in the history of Romanticism. Primarily for graduates.—*Two hours a week, first semester.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

History of French Literature to the End of the Fifteenth Century.

Lectures, reading, and reports. Primarily for graduates.—*Two hours a week, first semester.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth, and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor DE PONT:—

Dramatists of the Eighteenth Century.

Lectures and reports. This course is designed to furnish a survey of the French drama from the Classical to the Romantic School. For undergraduates and graduates.—*Three hours a week, second semester.*

Assistant Professor EFFINGER:—

The Dramatic Literature of the Nineteenth Century.

The Drama of the Revolution; the Melodramatic Period; the Romantic Movement; the Modern Drama. Lectures, reading, and reports.

Three hours a week, throughout the year.

Dr. THIEME:—

French Literature of the Sixteenth Century.

This course treats of the transition from the Middle Ages to the Renaissance and from the Sixteenth to the Seventeenth Century, with special study of Marot, Ronsard, Rabelais, Montaigne, Calvin, Jodelle, Garnier, and Hardy. Lectures, reading, reports. For undergraduates and graduates.—*Three hours a week, first semester.*

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

PROVENÇAL.

Professor CANFIELD:—

Outline of the Grammar, with readings in Appel's Provençalische Chrestomathie. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN.

The minimum requirement for admission to the courses announced below consists in courses 1 and 2 described in the University Calendar for 1903-1904, or an equivalent.

Professor LEVI:—

Dante: La Vita Nuova.

For undergraduates and graduates.

Dante: La Divina Commedia.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH.

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, described in the University Calendar for 1903-1904, or an equivalent.

Mr. _____:—

Cervantes: Novelas Ejemplares.

Two hours a week, first semester.

History of Spanish Literature in the Sixteenth and Seventeenth Centuries.

Lectures and readings.—*Two hours a week, second semester.*

GERMAN.

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 11, 12, and options in 5a, 5b, 5c, 7, 6a, 6b, 6c, 7a, and 8, as described in the University Calendar for 1903-1904, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas's edition. The drama is studied as a work of art, and the life and thoughts of Goethe, affording the basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature in the second half of the Nineteenth Century.

Lectures, assigned readings and discussions.—*Two hours a week, the second semester.*

Proseminary in Modern German Literature.

The Storm and Stress Movement.

Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Heinse, etc. The chief aim of this course is to acquaint the student with the methods of modern literary research. Primarily for graduates.—*Two hours a week, the first semester.*

Teachers' Course.

Lectures and discussions on the methods of teaching German and the organization of courses.—*Two hours a week, second semester.*

Assistant Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of Modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into Modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week throughout the year.* Omitted in 1904-1905; to be given in 1905-1906].

Dr. HILDNER:—**Hans Sachs.**

Lectures and reports.—*Two hours a week, second semester.*

Dr. FLORER:—**The Early Writings of Lessing.**

Lectures, investigations, and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Life and Works of Luther.

Lectures and reports. Special attention is paid to Luther's language. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Dr. BOUCKE:—**The History of German Civilization.**

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and to give a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest

times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

GOTHIC.

Assistant Professor DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN.

Dr. BOUCKE:—

[Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.* Omitted in 1904-1905; to be given in 1905-1906].

JOURNAL CLUB:—

Current Literature on Germanic Philology and Literature.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year, at which reports are made on the important contributions to Germanic philology and literature.

ENGLISH PHILOLOGY AND GENERAL LINGUISTICS.

The work of this department is concerned with the study of (1) the mother tongue, (2) the life and growth of language in general, and (3) the teaching of language.

Professor HEMPL:—

Old English*

A general introduction to the subject.—*Two hours a week, first semester.*

*The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

Old-English Phonology and Morphology.

This course consists of lectures on the history of Old-English sounds and forms, together with the private reading of Old-English prose texts and the investigation of two or three problems.—*Two hours a week, second semester.*

[Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.* Omitted in 1904-1905.]

Middle English.

This course consists of a brief introduction to the subject, the private reading of several of Chaucer's works, and the study of Chaucer's English as compared with the English of to-day.—*Two hours a week, first semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

English Etymology.

A study of the origin of English words and of the changes they have undergone in form and meaning.—*Two hours a week, first semester.*

Modern-English Grammar.

This course is intended especially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

Special Problems.

This course consists in the investigation of a series of special problems in English philology, dealing chiefly with the historical development of certain phases of English speech.—*Two hours a week, each semester.*

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

The Teaching of Modern Foreign Languages.

It is the object in this course to give practical instruction in the teaching of modern foreign languages, as well as advice in the matter of preparation for teaching. There will also be given a brief survey of the most important methods now employed.—*Two hours a week, second semester.*

The Principles of Linguistic Science.

Lectures on the most important phases of the life and growth of language. It is the object in this course to furnish to students of either classical or modern languages an explanation of the phenomena of the languages they are studying, and to bring these scattered data into connection with the underlying principles.—*Two hours a week, second semester.*

ENGLISH.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The Development of the English Novel, The English Satirists of the Seventeenth and Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

See also the courses in English Philology and General Linguistics.

Professor DEMMON:—

English Literature Seminary.

Each student is expected, first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Areopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book 1; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Browning's The Ring and the Book; Tennyson's Maud; Swinburne's Atalanta in Calydon.—*First semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; The Winter's Tale; Richard III; the two parts of Henry IV; Henry V; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth; Coriolanus.—*Second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctively American element by a comparative study with British authors.—*Second semester*. When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*Throughout the year*.

Studies in the text of Shakespeare.

The aim will be to illustrate the methods of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year*.

RHETORIC.

It is expected that graduate students will be reasonably proficient in writing. The study of composition, therefore, unless it is pursued with reference to the theory of teaching, is not regarded as a graduate study.

Professor SCOTT:—

[Principles of Style: Studies in Nineteenth Century Prose.

Two hours a week.

Omitted in 1904-1905.]

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester*.

Prose Rhythms.

The purpose of this course is the careful study and discussion of the principal theories regarding the nature and origin of typical English prose rhythms. A parallel study will be made of poetic rhythms for purposes of comparison.—*One hour a week, first semester*.

Newspaper Writing: Theory and Practice.

This course is intended for students who are preparing to do newspaper work. It is conducted as a seminary.—*One hour or two hours a week, first semester.*

Seminary in Rhetoric and Criticism.

The subjects of discussion will vary from year to year. Among the problems to be investigated are the following: The origin of prose; the development of paragraph structure; the theory of economy; the psychology of figure of speech; the sociological basis of the principles of usage; the morphology of publication; the rhythm of prose; the nature and origin of the types of discourse. It is proposed in 1904-1905 to make a study of the leading types of critical theory from Plato to the present time.—*Two hours a week, first semester.*

Teachers' Course: Methods of Teaching English Composition and Rhetoric.

The course includes (1) an outline of the underlying principles of rhetoric and composition, (2) a consideration of the problems of composition teaching, (3) a review of modern text-books, (4) a discussion of methods of teaching as outlined in the literature of the subject. Each member of the class is required to do some teaching.—*Two hours a week, second semester.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

The course is conducted as a seminary.

Reviews: Essays, Lectures, and Discussions.

The aim of this course is to furnish instruction, and give practice, in the writing of book-reviews. Each student will be required to write three reviews, one of which will be read before the class for discussion and criticism. A few lectures on standards of criticism and methods of reviewing will be given at the beginning of the semester, and specimen reviews will be analyzed in detail.—*Two hours, second semester.*

ORATORY.

Professor TRUEBLOOD:—

Study of Great Orators, ancient and modern.

Lectures on methods of public address and source of power. Study of representative selections. The method is similar to that in the English Literature Seminary.—*Throughout the year.*

Oral Discussions.

This course is designed to develop readiness of extemporization. It involves the application of the principles of logic and elocution in the discussion of leading topics of the day. Students are required to present briefs of the subjects discussed.—*Throughout the year.*

MUSIC.

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the largest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirous that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

First Group.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.*Two hours a week, throughout the year.***Second Group.****Historical Research.***Two hours a week, throughout the year.***Musical Criticism.***Two hours a week, throughout the year.*

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Researches in the Evolution of Musical Instruments.*Time to be arranged.*

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY.

Professor HUDSON:—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In the course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, the partition of Africa, and the problems raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

Two hours a week, throughout the year.

The course of the first semester combines an examination of the social, economic, and political condition of Russia, with a study of the advance of Russia in Europe and in Asia. During the second semester a study is made of the problems of the Far East.

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor Dow:—

Studies in Medieval and Early Modern European History.

Two hours a week, throughout the year.

This work consists of courses which extend over two years, and may be elected two years in succession. Courses 9a and 10a relate to the history of France, and chiefly to institutions. In the first semester a study is made of the institutions of the feudal period; in the second, attention is directed to changes that took place in the later medieval and early modern period. Courses 9b and 10b (9b the first semester and 10b the second) treat of the period of the Renaissance and the Reformation, and consist, like the other two, of a series of logically related special studies. The aim of the work, aside from gaining an intensive knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied especially in preparing oral and written reports.

Seminary in Medieval History.

Two hours a week, throughout the year.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatic, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.

Assistant Professor CROSS:—

Studies in English History since the Reformation.

Two hours a week, throughout the year.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, while primarily concerned with the separation from Rome under Henry VIII. and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the Church are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689. Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents. The course for 1904-1905 deals with the Restoration and the Revolution of 1688.

Assistant Professor FAIRLIE:—

Federal Administration.

This is a course in the principles and working machinery of the United States federal administration. It is intended to give a general knowledge of the practical operation of the government service and to show the opportunities for college graduates in the various branches of administration. The lectures begin with a study of the administrative authority of the President; the organization and influence of the Cabinet; and the executive powers of the Senate. The nine Executive Departments will then be studied in turn: the State Department, and the diplomatic and consular service, the Treasury Department, including the customs and internal revenue services, and the bureaus which supervise the currency; the War and Navy Departments; the Department of Justice; the Postoffice Department, and the various branches of the postal service; the Department of the Interior, including the man

agement of the public lands, patents, pensions, and Indian relations; the Department of Agriculture; and the Department of Commerce and Labor, including the bureaus transferred from the older departments and the new bureaus of manufactures and corporations. Attention will be given to the Inter-State Commerce Commission, and also to the Civil Service Commission, noting its methods and results and the means of entering the federal service. Finally, the organization and jurisdiction of the federal judiciary will be examined, embracing the District and Circuit Courts, the Circuit Courts of Appeal and the Supreme Court of the United States.—*Three hours a week. first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers. Local government, including county, township, and municipal administration, will be studied. And the organization of political parties, and their influence on the working of the governmental machinery, will be investigated and discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week. first semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, second semester.*

Comparative Administrative Law.

In this course, special attention will be given to English local administration, showing the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the combination of bureaucratic and popular administration in Prussia, and the system of special administrative courts in both countries. The central administration of these countries will also be examined, including the chief executives and the ministerial departments, with an account of the systems of examinations and training for the civil service. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Three hours a week second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties and their machinery, recent legislation concerning primaries, reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Seminary in Administration.

These are courses for original research on special topics. During the year 1904-5, a study will be made of Local Institutions

in the various states of the American Union. Special arrangements may also be made with students for work on other topics.
—*Two hours a week, each semester.*

Additional advanced courses in Administrative Law are offered in the Law Department, viz.: Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

AMERICAN HISTORY.

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extending over two years and a half, beginning with lectures on colonial history, and ending with a seminary in which special problems are investigated in original material. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American history, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history. A number of short courses of lectures by various well-known writers and teachers from other universities has been provided for the year 1904-1905.

Mr. CORWIN:—

American Colonial History.

Three times a week, second semester.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, to cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.

History of the Civil War and the Period of Reconstruction.

Three times a week, first semester.

Chief emphasis is laid on constitutional and political questions of the time, such as causes of secession, legal justification of secession, war powers of the President, methods and plans of reconstruction, etc., but military movements are not neglected.

Assistant Professor VAN TYNE:—

Constitutional and Political History of the United States,
1775-1861.

Three times a week, throughout the year.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lecture is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully of the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort also is made to trace the political and social development of the country.

Seminary in American History.

Two hours a week, throughout the year.

This course is primarily for graduate students who have already done a great deal of historical work. The object is to give training in the investigation of historical problems, to the handling of original material, and in the proper presentation of reports. In 1904-1905 the period studied will be that of the making of the Constitution. Graduate students will receive individual attention and assistance in the prosecution of their investigations.

Studies in American History.

Two hours a week, throughout the year.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Written reports are prepared under the direction of the professor. Special facilities are given for the use of the library.

PHILOSOPHY.

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

A. SEMINARIES.

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD.

History of Philosophy, Professor LLOYD.

Ethics, Professors WENLEY and LLOYD.

Modern Systems, Professors WENLEY and LLOYD.

Ancient Philosophy, Professors WENLEY and REBEC.

Philosophy of Religion, Professor WENLEY.

Æsthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD.

Logic, Professor REBEC.

Psychology, Rational and Experimental, Assistant Professor PILLSBURY.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been removed to the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY.

Professor WENLEY:—

*The Philosophy of Kant.

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

*The Philosophy of Hegel.

Study of the Logic and discussions.—*Two hours a week, second semester.*

Professor LLOYD:—

*Philosophy since Hegel.

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Professor REBEC:—

*American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

***Plato's Republic.**

Collateral reading and theses.—*Two hours a week, first semester.*

C. ETHICS.

Professor REBEC:—

***Aristotle's Ethics.**

Collateral reading and theses.—*Two hours a week, second semester.*

D. PSYCHOLOGY.

The Psychological Laboratory is well equipped for original investigation; and its facilities have been improved since 1904, when a new building was occupied.

Assistant Professor PILLSBURY:—

Original Investigation.

Hours as may be assigned, throughout the year.

E. SPECIAL COURSES.

Professor WENLEY:—

***Movements of Thought in the Nineteenth Century.**

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

Philosophy of Religion.

Two hours a week, first semester.

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1904-5 to the question of the possibilities of a realistic expression.—*Two hours a week, first semester.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1904-05 to the philosophy of evolution.—*Two hours a week, second semester.*

Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

THEORY AND HISTORY OF ART, AND ARCHAEOLOGY.

A. THEORY OF ART.

Professor REBEC:—

Æsthetics.

Two hours a week, first semester.

Elect in the Department of Philosophy; see p. 45.

Principles and Problems in *Æsthetic History.*

Two hours a week, second semester.

Elect in the Department of Philosophy; see p. 45.

Professor WINKLER:—

Lessing's *Laokoon.*

Two hours a week, second semester.

Elect in the Department of German; see p. 27.

Schiller's *Æsthetics.*

Two hours a week, first semester.

Elect in the Department of German; see p. 27.

Professor SCOTT:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

B. ART AND ARCHÆOLOGY.

Professor CRAIG:—

Interpretation of the Monuments of Babylonian and Assyrian Art.

Illustrated lectures.—*Two hours a week, first semester.*

Elect in the Department of Semitic Literature and History; see p. 23.

Professor D'OUGE:—

History of Greek Art.

Three hours a week, first semester.

Elect in the Department of Greek; see p. 15.

Professor KELSEY:—

The Antiquities of Pompeii.

Illustrated lectures.—One hour a week, first semester.

Elect in the Department of Latin; see p. 18.

The Topography and Monuments of Ancient Rome.

Three hours a week, second semester.

Elect in the Department of Latin; see p. 17.

Roman Art.

Illustrated lectures.—Three hours a week, second semester.

Elect in the Department of Latin; see p. 17.

THE SCIENCE AND THE ART OF TEACHING.

Professor PAYNE:—

History of Education, Ancient and Medieval.

Recitations and lectures. Text-book: Compayré's History of Pedagogy.—*Three hours a week, first semester.*

Graduate Seminary.

A critical study of Spencer's *Education*.—*Two hours a week, first semester.*

Theoretical and Critical Pedagogy.

The principles underlying the arts of teaching and governing. Lectures and readings. Text-book: Contributions to the Science of Education.—*Three hours a week, second semester.*

History of Modern Education.

Recitations and lectures. Text-book: Compayré's History of Pedagogy.—*Three hours a week, second semester.*

Graduate Seminary.

A critical study of Herbart's *Pedagogy*.—*Two hours a week, second semester.*

Professor WHITNEY:—

Theoretical and Critical Pedagogy.

The psychological principles underlying the act of teaching, the formation of the courses of study and the social institutions. Text-book: Harris's *Psychologic Foundations*.—*Three hours a week, first semester.*

Social Education.

This course embraces a consideration of the school as a social factor in its relation to the child, the home, the state and the church. Also a discussion of the relation of education to vocation and crime. Lectures and recitations.—*Two hours a week, second semester.*

POLITICAL ECONOMY AND SOCIOLOGY.

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy" or "Social and Industrial Reforms." For description see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduate as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as "Graduate Courses" are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organiza-

tion of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions. *Two hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. The seminary for the academic year 1904-1905 will study the financial history of the United States as presented in the annual reports of the Secretary of the Treasury. This subject will claim the attention of the Seminary throughout the year.

Professor TAYLOR:—

Principles of Finance.

In this connection the word Finance is used in the technical rather than the popular sense. That is, it does not include Money, Banking, Stock Speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial consideration, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to Taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out. *Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the Media of exchange, including Money and its various Credit Substitutes. This is followed by a study of the Natural Laws governing monetary phenomena, such as those which fix the Monetary Standard, those regulating the Movement and Distribution of Money, and so on. Next comes a sketch of Monetary History,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems. *Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking Instruments and Operations. This is followed by a study of banking Principles,—the natural laws which regulate the safety of banking, the volume of loan resources available to a bank, and

so on. The last weeks of the course are given to the History of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States. *Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the Nature of Capital, the Origin of Interest, the Laws of Value, and so on. The work of the class hour includes the discussion of readings assigned to the class generally and of reports on readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of Economic Theory: and so on.—*Two hours a week, second semester.*

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles ad-

vanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements and other sociological questions of present interest.

The class is supplied with a list of about twenty-five topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

Historical Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order*, Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field will be used. This course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, first semester.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient —*First and second semesters.*

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States, including such topics as location, coasts topography, climate, geology, and physiographic, botanical and economic regions; total population, sex, race and age classes, density and distribution of the population; and the social and political circumstances which determine the industrial efficiency of the American people.

The second part of the semester is occupied with studies in the industries connected with American agriculture, forestry and mining. In this part of the course the history of each industry is carefully traced, its present development and distribution are indicated, and its probable developments in the immediate future are discussed.—*Three hours a week, first semester.*

The Manufactures of the United States.

The history, methods, present location and condition of our chief manufacturing industries will be presented. The relation of these industries to one another, and to sources of raw materials, means of transportation, market facilities, and foreign trade will be discussed. In the case of some industries, the organization and policy of dominant corporations will be described. In this course, as well as the one preceding it, a liberal use is made of photographs, maps and charts to illustrate the subject.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, known as middlemen, who are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

As an introduction to the study, commerce will be defined, and the institutes of commerce, the market price, grades, weights and measures, and credit customs, will be discussed. Under agricultural marketing, the various systems employed in the United States will be presented, viz., commission selling, coöperation, public market, private market, contract and speculation. A special account will be given of the marketing of grain, cotton, tobacco, live stock, dairy products, fruit and wool.—*Two hours a week, first semester.*

b. The Manufacturer's Problem of Distribution.

The requirements of marketing as they affect the technique of manufacturing will be discussed, together with the principles governing the determination of price and quality. The various outlets employed in direct and indirect selling will be described in detail and the methods of stimulating trade. Efforts to regulate competition in the sale of manufactures, whether by trade marks, the factor system, curtailment and price agreements, pools, consolidations, or the laws of unfair trade, will be considered.—*Two hours a week, second semester.*

c. Wholesale Trade.

A detailed account of the principles and practices of modern wholesale trade.

d. Retail Trade.

The department store is described and its essential principles indicated. This is followed by an analysis of the functions performed by modern retail establishments, including such topics as the location of the establishment, range of stock, floor plans, buying, fixing prices, advertising, selling, delivery, credit and collection, store rules, invoice methods and the problems of general organization and management.—*Two hours a week, second semester.*

[Technique of Foreign Trade.

Treats of the supply and demand areas of the world with reference to the chief articles of international trade. It comprises a study of the documents, regulations and customary procedure of foreign trade, including methods of selling goods in foreign countries, shipping routes, port regulations, customary packages, weights and measures, tariffs, export bounties, commercial treaties, foreign industrial legislation and the regulations of the consular service.—*Two hours a week, second semester.*

Not given in 1904-1905.]

[American Trade With China, Japan and the Philippines.

This course will include a statement of the resources and industries of the countries mentioned. It will also include a consideration of the present and probable future trade of the United States with them, as conditioned by climate, race, language, social customs and prejudices and political conditions.—*Two hours a week, second semester.*

Not given in 1904-1905.]

Doctor SMAILEY:—

Corporations.

This course undertakes a study of corporations as a phase of industrial society. It considers the functions of the promoter and

underwriter, the organization of corporations under general laws, corporate securities and management, receiverships and reorganizations. It pays particular attention to those problems—such as promoter's liability, over-capitalization, protection of minority interests, corporation wrecking, etc.—to which the growth of corporations has given rise, and discusses the various programs of public supervision and control.—*Two hours a week, first semester.*

INTERNATIONAL LAW.

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

MATHEMATICS.

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with reference to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with reference to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry,

together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

This course forms a direct continuation of the course in elementary mechanics; it is mainly devoted to the dynamics of a rigid body.—*Three hours a week, second semester.*

Projective Geometry.

This course begins with the pure geometry of position, Reye's work being used as a text; this is followed by the analytic treatment, with the aid of homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Dr. PIERCE:—

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Dr. GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots; resultants; solution of a system of n linear equations; theorems concerning integral functions of one and two variables; elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution

of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Goursat's *Cours d'analyse mathématique*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Beginning with simple problems in attraction, the course develops the fundamental properties of the potential function; then the general theory of vector fields is discussed and applied to some particular branch of mathematical physics.—*Three hours a week, first semester.*

Professor MARKLEY:—

Theory of Functions.

The first part of this course deals with functions of real variables in which are developed the fundamental ideas of irrational numbers, continuity, and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometrical representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

PHYSICS.

The courses announced below presuppose about one and a half years' collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—

Electrochemistry.

Three hours a week, first semester.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.

Electricity.

Two hours a week, second semester.

An intermediate course based on J. J. Thomson's Electricity and Magnetism.

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations, *two hours a week, second semester.* This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of these principles to numerous problems in physics and chemistry.

Professor PATTERSON:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distributions, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week, first semester; twice a week, second semester.*

Alternating Current Phenomena: Steinmetz.

Two hours a week, second semester.

The course includes the application of complex quantities to the study of alternating current phenomena, and is accompanied by a course in laboratory work in which the conclusions are verified.

Dynamo-Electric Machinery.

Lectures. *twice a week*; laboratory work, *once or twice a week, second semester.*

Alternating Currents.

Lectures, *twice a week*; laboratory work, *once or twice a week, first semester.*

The courses in Dynamo-Electric Machinery, Alternating Currents, and Alternating Current Phenomena form a graded series covering the theory of dynamo-electric machines, alternate current working, transformers, and alternating current phenomena as applied to generators, distribution of power, and induction motors.

Professor REED:—

The Theory of Sound.

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—Lectures, *two hours a week*; laboratory work, *twice a week, first semester.*

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week, second semester.*

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester.*

Dr. RANDALL:—

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases: also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, first semester.*

Dr. SMITH:—

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a very thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester; three times a week, second semester.*

Professor CARHART and Professor REED:—

Physical Colloquium.

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

CHEMISTRY.

Resident graduates, registered under the provisions of Admission and Registration given on page 10, may enter upon any of the courses in chemistry in this University for which they are qualified. A full description of these studies can be obtained in the ANNOUNCEMENT OF COURSES OF CHEMISTRY, for 1904-05, issued separately. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to the following named undergraduate courses in this University (University Calendar for 1903-1904; Courses 1 and 2, Courses 3 and 5, Course 7.—making in all about twenty-five hours of undergraduate credit.*

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during the semester.

If chemistry is taken as a minor subject in work registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1 and 2, the opening courses in general chemistry.

Candidates for a doctor's degree, in addition to the requirements above specified, must have satisfied the committee in charge of their studies as to their fitness to enter upon the higher work. A reading knowledge of German and French is necessary.

Graduate students who are not in work for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for convenience of the readers. A list of the sets of periodicals is given in the Announcement of Courses in Chemistry, referred to above. Chemical technology, metallurgy, sugar chemistry, phyto-chemistry, food analysis, and pharmacology, are provided for.

A. GENERAL AND PHYSICAL CHEMISTRY.

Professor FREER:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Chemical Literature; Journal Club.

The Journal Club discusses current chemical literature. It is under the direction of Professor FREER, but the professors, instructors, and assistants in the laboratory take part therein. All of the prominent journals are divided among the participants, who report on the most interesting topics in rotation.—*One hour to one and one-half hours a week, throughout the year.*

Laboratory Research.

The work may be either organic or inorganic, and the student is at liberty to select one from a number of topics proposed. The work includes the study of the literature bearing upon the topics. In order to accomplish results the student should have at least five clear half days a week to devote to the work. This statement applies to all research courses.—*Hours arranged with instructor, throughout the year.*

Assistant Professor BIGELOW:—

Physical and Theoretical Chemistry.

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry. Lectures.—*Four hours a week, second semester.*

Laboratory Research in Physical and Electrochemistry.

Hours arranged with instructor.

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and also includes a training in preparing demonstrations proper for use in teaching.—*Hours arranged with instructor, throughout the year.*

Mr. HIGLEY:—

Laboratory Work in Selected Topics of Inorganic Chemistry, including Inorganic Preparations.

This work is preparatory to research and is also especially intended for teachers.

Laboratory Research in Inorganic Chemistry.

Hours arranged with instructor.

Dr. HULETT:—

Physical and Theoretical Chemistry.

Advanced Course. Electro-Chemistry and selected topics. Lectures. *Two hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Two courses cover, as far as possible, the ground outlined in the lectures. They include the standard methods of determining molecular weights, studies of solutions, dissociation, electrochemistry, etc. The first course at least is essential for all who wish to become acquainted with modern chemistry.—*Hours arranged with instructor.*

Laboratory Work with the Polariscope and the Spectroscope.

This course includes the theory of the instruments, their practical applications and the study of stereochemical questions involved.—*Hours arranged with instructor, second semester.*

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Hours arranged with instructor.

B. ORGANIC, INDUSTRIAL AND ANALYTICAL CHEMISTRY.

Professor PRESCOTT:—

Studies in Recent Research.

Library work upon chosen questions, their discussion, and the writing of reviews.—*Throughout the year.*

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, in second semester of 1904-05.*

Investigation in Organic or in Analytical Chemistry.

Laboratory work upon subjects selected, *throughout the year.*
Hours arranged.

Professor JOHNSON:—

Qualitative Analytical Chemistry.

Following undergraduate Course 3 (University Calendar for 1903-1904) or its equivalent. Laboratory work, including electrical methods, with personal instruction, *hours arranged with instructor.*

Professor CAMPBELL:—

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1903-1904) or its equivalent. Laboratory work directed by lectures in any of the three courses, namely: (1) Advanced quantitative methods in general, (2) the analysis of minerals, (3) iron and steel analysis. Electrolytic methods are much employed, and there is a room devoted to their use.—*Hours arranged with instructor, throughout the year.*

Investigation in Analytical Method, Inorganic Structure, and Metallurgical Chemistry.

Laboratory work upon questions related to researches published from the department. Use is made of Le Chatelier's pyrometer, as well as of calorimetric methods in study of heats of formation. Special work is given in micrometallography, as bearing upon the constitution of metals and their alloys.—*Hours arranged with instructor, throughout the year.*

Professor CAMPBELL and Assistant Professor WHITE:—

Technical Methods and Investigations. Laboratory work as follows:—

- (1) Gas Analysis, Calorimetry, and Photometry.
- (2) Technical examination of Gold and Silver Ores.
- (3) The Cement Industry, with special reference to influence of composition and temperature of burning.
- (4) Coal, gas and by-products.
- (5) Influence of heat and mechanical treatment on constitution or iron and steel.
- (6) The chemistry of beet sugar, with special reference to its manufacture.

Other subjects may be chosen after consultation.—*Hours arranged with instructor, throughout the year. In (2) the work must begin in first semester.*

Professor GOMBERG:—

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, in the first semester of 1904-05.*

Lectures on the Benzene Derivatives.

Following undergraduate Course 7 (University Calendar for 1903-1904) or its equivalent.—*Three times a week, second semester.*

Organic Synthesis and Ultimate Analysis.

Laboratory work.—*Hours arranged with instructor, throughout the year.*

Investigation in Organic Chemistry.

Laboratory work upon subjects related to Professor GOMBERG'S published researches.—*Hours arranged with instructor, throughout the year.*

Assistant Professor SCHLOTTERBECK:—

Phytochemical Research.

The chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.—*Laboratory work, throughout the year.*

Assistant Professor WHITE:—

Chemical Technology.

Lectures on the main chemical industries, inorganic in the first semester, and organic in the second semester. Among the subjects treated are the alkali and acid industries, cements, wood and coal distillations, beet sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Dr. DUNLAP:—

Organic Analysis.

The technical examination of various organic industrial products, such as oils, fats, waxes, food-stuffs, etc. For those having sufficient preparation, this course may be taken as a research course on some organic-technical problem.—*Hours to be arranged by consultation. Given both semesters.*

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY.

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN:—

1. Food Analysis.
2. Water Analysis.
3. Research on the Chemistry of Bacteria.

Students doing graduate work in these subjects will be required to work in each subject for at least one year.

Professor NOVY:—

1. Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1903-4.—*Hours arranged with instructor, either first or second semester.*

2. Pathogenic Protozoa.

A study of the distribution and means of transmission of the protozoal diseases. The laboratory work will cover the diagnostic and cultivation methods and such work with the insect hosts as will be practicable.

3. Advanced Physiological Chemistry.

Laboratory work and reading.—*Hours arranged with instructor, either first or second semester.*

ASTRONOMY.

A knowledge of general astronomy and calculus is required for all courses. In the theoretical courses a careful training is given in those principles of exact astronomy which should be prerequisites for all investigations.

Professor HALL:—

Spherical Astronomy.

Transformation of coördinates, precession, nutation, aberration, determination of fundamental constants, and theory of instruments.—*Three hours a week, throughout the year.*

Theory of Least Squares.

Two hours a week, first semester.

Theory and Computation of Orbits.

Five hours a week, first semester.

Mathematical Theory of Planetary Motion.

Three hours a week, second semester.

Extended Practical Course.

Hours arranged with instructor, throughout the year.

NOTE.—The Observatory is provided with a 12¾-inch equatorial by Fitz, a 6⅓-inch Pistor and Martins meridian circle, 6-inch Fauth equatorial, 3-inch meridian transit with zenith telescope, attachments, surveyor's transit, sextants, chronograph, and chronometers.

MINERALOGY

The higher work in mineralogy presupposes an acquaintance with general and analytical inorganic chemistry, and at least such knowledge of mineralogy as could be obtained from a course of study combining theoretical instruction with practice in determining minerals. The special character of the work in each case is determined after consultation with the applicant. The work is directed by Professor PETTEE.

GEOLOGY.

The course of instruction in geology for undergraduates, as announced in the University Calendar, embraces from two to three years University work. The first year is devoted to elementary studies in physical geology, historical geology, and physical geography, giving three hours a week to each for one semester. During the second year more detailed instruction is given, two hours each week, in the same general subjects. Each student is given a special subject for investigation in connection with which a thesis of about 2,500 words is required. During the second semester paleontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary courses have been pursued. Those who have done more work than is represented by the elementary course may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of geology will be read with special reference to Pleistocene geology, and to the origin and classification of topographic forms, glacial records, lake histories, volcanoes, erosion, and other processes by which the surface of the earth has come to have its present form.

The museum contains a series of fossils selected to illustrate the geological history of North America. This collection is intended especially for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lectures will be returned to the cases in the museum, where they will be available for examination at any time.

There is a second collection embracing some ten thousand specimens of both American and European fossils, which is arranged zoologically and intended for the use of advanced students in paleontology. Special collections of rocks, brachiopods, corals, etc., numbering from one hundred and fifty to two hundred specimens each, are arranged in the geological laboratory for the immediate use of students.

The collection in physical geology contains a well selected series of specimens to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them in cases provided for the purpose, and facilities for consulting original monographs and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopes and photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

The work in geology is conducted by, or under the direction of, Professor RUSSELL.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given in the University Calendar for 1903-1904. A library shelved in the laboratory contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in the literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a *minor for the master's degree* will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctorate a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a *major for the doctor's degree* are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement, and the special announcement of the department.

Those electing zoology as a major, will find it of advantage to select, as a *minor study*, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Embryology of Vertebrates.

Three lectures and laboratory work, about 12 hours per week.

The laboratory work is largely on the chick, with supplementary material from other vertebrate classes. Much attention is given to methods of studying serial sections, and to the preparation of anatomical descriptions and drawings from such sections. The lectures treat of vertebrate development from the comparative standpoint, and of general experimental embryology.—*Six hours per week, first semester.*

Vertebrate Zoology and Comparative Anatomy.

Three lectures or quizzes. Laboratory work, about 12 hours per week.

In addition to the regular class meetings there is a quiz or demonstration hour optional with the instructor. Excursions are arranged at intervals for the field study of the habits of vertebrates, and for collecting. Lectures on the classification, habits, and distribution of vertebrates occupy about one-half of the lecture hours; the remaining hours are devoted to Comparative Anatomy of the Vertebrates, with special reference to the evolution of the organs of the higher vertebrates from those of the lower members of the group. Laboratory work is on selected forms, the lancelet, the lamprey, the skate, the perch, the turtle, the pigeon, and the cat or rabbit, together with a study of preparations of other forms. It is carried on altogether by means of typewritten laboratory directions prepared by the instructors.—*Six hours per week, second semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna. *Two or more hours, throughout the year.*

Dr. HOLMES:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.

This is a year's course, but is so divided that the two parts are given in the first semesters of alternate years. Course 4a deals with Protozoa, coelenterates, worms, crustaceans, and several smaller groups. Course 4b includes molluscs, echinoderms, myriapods, arachnids, and insects.

Course 4a will be given in 1904-1905.—*Five hours, first semester.*

Systematic Zoology: The Crustacea.

Students will work on the local fauna.—*Two or three hours a week, throughout the year.*

Dr. PEARL:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals,—those features of the life processes that are common to organisms. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures per week and two half days of laboratory work.

Some acquaintance with physical chemistry will be found valuable for those who intend to pay especial attention to the physiological side of biological science; for any extensive progress in this direction such acquaintance is indispensable.

Students who have had one year's work in Biology (Botany or Zoology) are permitted to take this course. It may appropriately be taken in the second semester of the same year in which Invertebrate Zoology (Course 4) is taken.—*Four hours per week.*

Statistical Zoology.

Lectures dealing with the methods and important results of the statistical study of variation. Especial attention will be paid to the methods used in this work, the aim being to give the student a knowledge of the manner in which biological statistics are collected and treated. To this end exercises in handling

statistics gathered from various sources will be assigned in connection with the lectures. The significance of the results which have been obtained by the use of the statistical method, with reference to current theories of heredity, correlation, etc., will be discussed.

Laboratory work to accompany the lectures may be elected as Course 6a. Each student will be assigned a definite, small problem for investigation. In the assignment of these problems special attention will be paid to types found abundantly in the local fauna.—*Two hours per week, first semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Two hours.*

Dr. DUERDEN :—

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or Physiology. Laboratory work, lectures, and quizzes.—*Six hours per week, second semester.*

The Anthozoa.

A special course of four lectures with laboratory work. May be taken only by special permission.—*One hour, to be arranged, second semester.*

Mr. Charles C. ADAMS:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology. The lectures and conferences outline the general principles.

The field trips are devoted to the study of the animals, the conditions under which they live; methods of observation, taking notes and collecting; special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and amphibians and reptiles among vertebrates. One class meeting and two afternoons laboratory work each week.—*Three hours per week.*

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.

Dr. HOLMES:—

Investigations in

The behavior of animals.

Dr. PEARL:—

Investigations in

Experimental Zoology, primarily by biometrical methods.

Dr. DUERDEN:—

Investigations in

The anatomy, taxonomy, and physiology of the Anthozoa.

The ZOOLOGICAL FACULTY:—

a. Journal Club.

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—*One hour a week, throughout the year.*

b. Evolution Problems.

In addition to the course in the elements of evolution (zoology 3) offered to undergraduates, the department offers an advanced course on evolution problems. This course aims to give a critical appreciation of the development of the evolution theory since Darwin and of the bearing of that development on other fields of knowledge. The theory of evolution has so profoundly influenced psychology, ethics and social science, to say nothing of other fields, that an acquaintance with the ground and import of this theory is a necessary part of the equipment of the student in any of these fields, as well as of the biologist who has an interest in the broader aspects of his subjects. It is the purpose of the course to give the student the necessary basis for appreciating in some degree the import of biology.—*Two hours, second semester.*

THE BIRD CLUB.

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

BOTANY.

The work in botany in this University is divisible into morphology, physiology, and ecology. For the study of these branches there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. A plant garden on the campus, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to preparation and needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctorate, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found on pages — of this Announcement.

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below, nearly all of which consist largely of laboratory work.

Professor SPALDING:—

[Distribution of Plants.

Lectures in connection with studies of the local flora.—*Two or more hours a week, second semester.*

Omitted in 1904-1905.]

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours' laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more hours a week, throughout the year.*

Teachers' Course.

Conferences and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations.—*One hour a week, second semester.*

Dr. POLLOCK:—

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three hours a week, second semester.*

Dr. BURNS:—

Ecology.

A study of the habits and adaptation of plants. The floras of hills and valleys, of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more hours a week, first semester.*

Variation under Natural and Artificial Conditions.

Plant breeding. Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two hours a week, first semester.*

THE BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

B. PRIMARILY FOR GRADUATES.

Professor SPALDING:—

[Ecological Investigations.

Problems as to the origin of specific characters; variation; and the origin of local plant societies.

Omitted in 1904-1905.]

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Dr. POLLOCK:—

Investigation in the Morphology and Physiology of Fungi
and in Plant Pathology.

Dr. BURNS:—

Investigation in Ecology and Experimental Morphology.
Problems in field and laboratory work.

FORESTRY.

Mr. C. A. DAVIS:—

1. Silviculture.

This course is given as follows:

(1a) Silviculture. Introductory, including the study of soil, climate and other conditions.—*Three hours, first semester.*

(1b) Silviculture. Method of artificial and natural reproduction; seedbed and nursery work; planting and sowing in forest; reforestation of denuded lands, prairies, dunes, etc.—*Three hours, second semester.*

(1c) Silviculture. Care of forest; cleaning and thinning; protection of forests against insects and other enemies.—*Three hours, first semester.*

Courses 1a, 1b, and 1c should be taken in the order here given.

Professor ROTH:—

2. Forest Mensuration and Description.

Lectures, laboratory work, and field work.—*Four hours, first semester.*

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurement of the rate of growth of trees and stands; methods and manner of describing a tract of forest to secure its proper management.

Open only to students of forestry in first year.

3. Forest Utilization.

Use of timber; points of production and market; method of lumbering, milling, and marketing; minor forest industries. Lectures.—*Three hours, second semester.*

Open only to forestry students in their second year.

4. Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved in judging the value of the forests and forest operations. Lectures and field work.—*Five hours, throughout the year.*

Open only to forestry students in their second year.

Mr. C. A. DAVIS:—

5. Dendrology.

Monographic study of forest trees; their life history, distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory work and field work.—*Three hours, second semester.*

Open only to forestry students in first year.

6. Timber Physics.

Study of structure, distinctive characteristics and technical properties of the principal uses of timber. Lectures and laboratory work.—*Three hours, first semester.*

Open to forestry and engineering students. Regular forestry students are expected to take this course in their second year.

ANATOMY AND HISTOLOGY

Professors McMURRICH and HUBER:—

1. Anatomy of the Central Nervous System.

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have taken anatomy Course 4 or an equivalent.—*Three hours, first or second semester.*

2. Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in histology.—*Hours to be arranged with the instructor, throughout the year.*

3. Anatomical Research.

4. Histological Research.

These courses are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors throughout the year.*

PHYSIOLOGY.

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a *minor for the master's degree* is five hours of lectures the first semester, three hours the second semester, a laboratory course of five afternoons a week for eight weeks, the second semester, and a report on the literature of some limited subject. No research work will be required, except from those who have already taken advanced work in physiology. The requirements for a *major for the master's degree* includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirements for a *minor for a doctor's degree* involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a *major for the doctor's degree* is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, biology, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research, under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week. first semester; three hours a week, second semester.

Laboratory Course.

Five afternoons a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

Catalogue of Students, 1903-1904*

NAME	RESIDENCE
Henry Herbert Armstrong, A.B., 1901, A.M., 1902, <i>Holder of the Buhl Classical Fellowship</i> , Latin; Greek; Ancient Philosophy.	<i>Ann Arbor.</i>
Louis Ascham, A.B., 1903, Physics; Physical Chemistry; Pedagogy.	<i>Canby, Minn.</i>
Frederick Amos Baldwin, M.D., 1898, A.B., 1902, Bacteriology; Physiological Chemistry; Organic Chemistry.	<i>Ann Arbor.</i>
Earl Forest Benson, A.B., 1903, American History; Political Economy; Pedagogy.	<i>Ann Arbor.</i>
Robert Louis Benson, A.B., 1902, Physical Chemistry; Analytical Chemistry; Physics.	<i>Mount Morris.</i>
Harriet Williams Bigelow, A.B., <i>Smith College</i> , 1893, Practical Astronomy; Theoretical Astronomy; Physics.	<i>Utica, N. Y.</i>
James Pyper Bird, A.B., 1893, Romance Literature; Romance Philology; Latin.	<i>Ann Arbor.</i>
Helen Louise Bishop, A.B., <i>Vassar College</i> , 1897, <i>Detroit</i> . Latin; Greek; Aesthetics.	
Georgiana Cleis Blunt, Ph.B., 1896, Ph.M., 1897, <i>Ann Arbor</i> . Aesthetics; Rhetoric; Metaphysics.	
Katherine Bogle, A.B., 1903,	<i>Ann Arbor.</i>
Frank Arthur Bohn, Ph.B., <i>Ohio State University</i> , 1900, A.M., <i>ibid.</i> , 1901, <i>Holder of the Peter White Fellowship in American History</i> , American History; European History; Political Science.	<i>Olmstead Falls, O.</i>
Wesley Bradfield, A.B., <i>Alma College</i> , 1902, Botany; Forestry; Physiological Botany.	<i>Decatur.</i>
Agnes Ewing Brown, B.S., <i>University of South Dakota</i> , 1900,	<i>South Bend, Ind.</i>
Forest Buffen Harkness Brown, A.B., 1902, M.S., 1903, Forestry; Systematic Botany; Ecology.	<i>Ypsilanti.</i>
Thomas Brigham Buell, A.B., 1902,	<i>Union City.</i>
Mollie Drew Butts, A.B., 1903, Latin; Greek; English Literature.	<i>Lansing.</i>
Joseph Aldrich Bursley, B.S. [Mech. E.], 1899, <i>Fort Wayne, Ind.</i>	

*The principal subjects of study pursued by candidates for an advanced degree are indicated under their respective names; the subject first named being the major study.

- Erle Elsworth Clippinger, A.B., 1903, *Eau Claire.*
Rhetoric; English Literature; Aesthetics.
- Alphonso Morton Clover, B.S., 1899, *Ann Arbor.*
General Chemistry; Organic Chemistry; Physical Chemistry.
- Lee Holt Cone, B.S., *Pomona College*, 1901, *Santa Ana, Cal.*
Organic Chemistry; Physical Chemistry; Physics.
- Frank Lawrence Cooper, B.S., 1900, *Owosso.*
Physics; Mathematics; Physical Chemistry.
- Cornelia Alice Copeland, A.B., 1903, *Dexter.*
American Literature; Rhetoric; Aesthetics.
- Edward Samuel Corwin, Ph.B., 1900, *Plymouth.*
American History; European History; History of Political Theory.
- Alfred Dachnowski, A.B., *Taylor College*, 1898, *Mount Pleasant.*
A.M., *ibid.*, 1900,
Botany; Physical Chemistry; Philosophy.
- Charles Albert Davis, A.B., *Bowdoin College*, *Ann Arbor.*
1886, A.M., *ibid.*, 1889,
Botany; Ecology; Geology.
- Jean Dawson, A.B., 1902, A.M., 1903, *Caro.*
Zoology; Animal Ecology; Plant Ecology.
- Henry William Dubée, A.B., *Harvard University*, *Grand Haven.*
1900, A.M., *ibid.*, 1902,
German Literature; German Philology; Aesthetics.
- Frances Jewett Dunbar, A.B., 1903, *Manlius, N. Y.*
- Frances Williams English, A.B., *Greenville College*, *Belfast, N. Y.*
1901, A.M., *ibid.*, 1902,
English Literature; English Philology; History.
- Jessie Cook English, A.B., *Greenville College*, *Belfast, N. Y.*
1901, A.M., *ibid.*, 1902,
Latin; Roman Political Institutions; English.
- Robert Byrns English, A.B., *University of Rochester*, 1896, A.M., *ibid.*, 1898, *Holder of the Buhl Classical Fellowship*, *Greenville, Ill.*
Latin; Greek; Philosophy.
- Harry Day Everett, A.B., *Cornell University*, *Malone, N. Y.*
1903,
Forest Management; Silviculture; Forest Mensuration.
- Adelaide Gemberling, A.B., 1902, *Ann Arbor.*
Physical Chemistry; Physics; Mathematics.
- Clarence Wilson Greene, A.B., 1903, *Ann Arbor.*
Physics; Mathematics; Analytical Chemistry.
- Amanda Jane Hamilton, Ph.B., *Albion College*, *East Tawas.*
1895,
Physical Chemistry; Organic Chemistry; German.
- Nellie May Hamilton, A.B., 1903, *Ann Arbor.*
German; English; Pedagogy.
- William D. Henderson, A.B., 1903, *Petoskey.*
Physics; Physical Chemistry; Psychology.
- George Oswin Higley, A.B., 1891, M.S., 1893, *Ann Arbor.*
Inorganic Chemistry; Physics; Mineralogy.
- Cary LeRoy Hill, A.B., 1901, *Chelsea.*
Forest Management; Timber Culture; Physics.

- Laura Emma Hoffman, A.B., *Hiram College*,
1901, *Kalamazoo*.
Rhetoric; English Literature; Aesthetics.
- Clifford Dyer Holley, B.S., *University of Maine*,
1900, M.S., *ibid.*, 1902, *Udly*.
Organic Chemistry; Chemical Technology; Analytical Chemistry.
- Clara May Hosie, A.B., 1902, *Wayne*.
- Genevieve Imus, A.B., 1903, *Ann Arbor*.
Organic Chemistry; Physical Chemistry; English.
- Frederick Charles Irwin, B.S., 1895, *Detroit*.
Analytical Chemistry; Physical Chemistry; Physics.
- Lewis Ralph Jones, Ph.B., 1889, *Burlington, Vt.*
Physiological Botany; Systematic Botany; Bacteriology.
- Blanche Louise King, A.B., *Olivet College*, 1899,
A.B., 1903, *Romeo*.
Latin; Greek; Ancient Philosophy.
- Richard Ray Kirk, A.B., 1903, *Saint Clair*.
Rhetoric; English Literature; Aesthetics.
- Adoniram Judson Ladd, A.B., 1894, A.M., 1900, *Ann Arbor*.
Pedagogy; Psychology; Philosophy.
- Amy Sanders Lane, A.B., *Wellesley College*,
1896, *Hadley, Mass.*
Latin; Roman Political Institutions; Rhetoric.
- Mary Frances Leach, B.S., 1893, Ph.D., 1903,
*Holder of the Ford Fellowship in Physio-
logical Chemistry*, *Detroit*.
- Francis Jean Larned, Ph.B., *Kalamazoo College*,
1903, Ph.B., *University of Chicago*, 1903, *Kalamazoo*.
Rhetoric; English Literature; Aesthetics.
- Clyde Leavitt, A.B., 1901, *Bellaire*.
Forest Management; Silviculture; Forest Mensuration.
- William Henry Lightstone, Jr., A.B., *Miami Uni-
versity*, 1903, *Holder of the Parke, Davis &
Co. Fellowship in Chemistry*, *Arkansas City, Kan.*
- Dale Livingstone, A.B., 1896, *Detroit*.
Greek; Latin; Roman Institutions.
- Ernest Dale Long, A.B., *Hiram College*, 1898, *Angola, Ind.*
Latin; Pedagogy; Philosophy.
- Frank Myers Longanecker, A.B., *Hiram College*,
1899, *Hiram, O.*
Latin; Sanskrit; Ancient Philosophy.
- Almira F. Lovell, A.B., 1884, *Ann Arbor*.
- Ward J. MacNeal, A.B., 1901, *Holder of the
Rockefeller Fellowship in Bacteriology*, *Fenton*.
Bacteriology; Sanitary Science; Organic Chemistry.
- Frank Burr Marsh, A.B., 1902, *Big Rapids*.
History; European Political Institutions; Sociology.
- Thomas Adams Martin, B.S., *Ohio University*,
1895, A.M., *Ohio Wesleyan Univ.*, 1898, *Commerc'l Point, O.*
Mathematics; Mechanics; Pedagogy.

- Beatrix Kate Mary, A.B., *Olivet College*, 1903, *Lansing*.
 Latin; English Literature; Comparative Linguistics.
- Herman G. Milbrandt, B.L., *University of Wisconsin*, 1903, *Edgar, Wis.*
 German Literature; Germanic Philology; English Philology.
- Stephen Ivan Miller, Jr., LL.B., 1896, A.B.,
Leland Stanford, Jr., University, 1898, *Pontiac*.
 Political Economy; Political Science; Sociology.
- Clarabel Milliman, A.B., 1902, *Rochester, N. Y.*
 American History; English History; Botany.
- Artios Dio Nye, A.B., *Baldwin University*, 1897, *Fields, O.*
 English Literature; Latin Literature; Roman Political Institutions.
- Genevieve Delony O'Neill, A.B., 1901, *Macatawa*.
 French; English Literature; Spanish.
- Carl Safford Patton, A.B., *Oberlin College*, 1888, *Ann Arbor*.
 Hebrew; Hellenistic Greek; Philosophy.
- George Wilcox Peavy, B.L., 1895, *Ann Arbor*.
 Forest Management; Silviculture; Forest Mensuration.
- Roy Romanzo Peck, A.B., 1902, *Ann Arbor*.
 French Literature; French Philology; English Literature.
- Luis Marino Pérez, A.B., 1903, *Kingston, Jamaica*.
 European History; Philosophy of History; Sociology.
- Flora Prowdley, Ph.B., 1898, A.M., 1903, *Constantine*.
 Rhetoric; English Literature; Aesthetics.
- Candace Wilcox Reynolds, Ph.B., *Olivet College*,
 1897, *Olivet*.
 Botany; Plant Physiology; Zoology.
- Hardie Levi Reynolds, B.S., *Albion College*.
 1900, *Leslie*.
 Physics; Chemistry; Pedagogy.
- Charles Frederick Curtis Riley, A.B., *Doane College*, 1901, *Crete, Neb.*
 Comparative Embryology; Animal Behavior; Physiological Zoology.
- William Rinck, A.B., *Hope College*, 1900, A.B.,
 1901, A.M., 1903, *Holland*.
 Mathematics; Physics; German.
- James Marion Robb, A.B., *Greenville College*,
 1899, *Evansville, Wis.*
 Mathematics; Physics.
- Alexander Grant Ruthven, B.S., *Morningside College*, 1903, *Ruthven, Ia.*
- Edward Hildreth Ryder, A.B., 1903, *Ann Arbor*.
 American History; Political Science; Political Economy.
- Philip Louis Schenk, A.B., 1902, *Holder of the Stearns Fellowship in Music*,
Ann Arbor.
 Music; Philosophy; Semitics.
- John William Scholl, A.B., 1901, A.M., 1902, *Ann Arbor*.
 German Literature; Germanic Philology; General Linguistics.
- Frederick William Schule, B.S., *University of Wisconsin*, 1901, *Chicago, Ill.*
 Analytical Chemistry; Chemical Technology; Metallurgy.

- John Frederick Shepard, B.S., *Saint Lawrence University*, 1901, *White Hall, Ill.*
 Psychology; Neurology; Philosophy.
- Durand William Springer, B.S., *Albion College*, 1886, *Ann Arbor.*
 Municipal Administration; Commercial Law; Transportation.
- Manson Alexander Stewart, A.B., 1903, *Hadley.*
 Latin; Greek; Classical Archæology.
- Donald Clive Stuart, A.B., 1903, *Detroit.*
 French; Italian; General Linguistics.
- George Atchison Thompson, A.B., *Toronto University*, 1902, *Saint Mary's, Ont.*
- Richard Ryan Thompson, A.B., *South Western Baptist University*, 1899, *Martin, Tenn.*
 Romance Literature; Romance Philology; German.
- Orrin Edward Tiffany, A.B., 1895, A.M., 1896, *Greenville, Ill.*
 American History; Commerce and Industry; Political Economy.
- Edgar Nelson Transeau, A.B., *Franklin and Marshall College*, 1897, *Holder of the Dexter M. Ferry Botanical Fellowship*, *Williamsport, Pa.*
 Botany; Plant Physiology; Geology.
- Zaida Elvira Udell, A.B., 1903, *Grand Rapids.*
 Philosophy; Psychology; Sociology.
- Eloise Waring, A.B., 1901, *Tecumseh.*
 Latin; Roman Political Institutions; American History.
- Joseph DeWitt Warner, A.B., *Cornell University*, 1903, *New York, N. Y.*
- May Wheeler, A.B., 1901, Ph.D., 1903, *Holder of the Vaughan Fellowship in Hygiene*, *Indianapolis, Ind.*
- Harry Probasco Wherry, B.S. [Chem. E.], 1903, *Chicago, Ill.*
- Hobart Hurd Willard, A.B., 1903, *Chicago, Ill.*
 Physical Chemistry; Organic Chemistry; Physics.
- John G. Winter, A.B., *Hope College*, 1901, *Holland.*
 Latin; Greek; Philosophy.
- William Robins Wright, A.B., 1903, *Pattensburg, N. Y.*
 Pedagogy; Psychology; Sociology.
- Karl Wilhelmj Zimmerschied, A.B., 1903, *Kansas City, Mo.*
 Chemistry; Mineralogy; Commerce.

The following student, enrolled in the Department of Medicine and Surgery, is also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

- David J. Levy, A.B., 1902, *Kalamazoo.*
 Bacteriology; Physiological Chemistry; Hygiene.

The following student, enrolled in the Department of Law, is also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

- Milton Sylvester Koblitz, A.B., 1903, *Cleveland, O.*
 Political Economy; History; Political Philosophy.

CANDIDATES FOR A MASTER'S DEGREE STUDYING IN ABSENTIA.

NAME	RESIDENCE
Ira Alanson Beddow, Ph.B., 1895, American History; Roman History; History of Education.	<i>Olivet.</i>
Ralph Henry Elsworth, A.B., 1902, Commerce and Industry; Political Economy; Sociology.	<i>Ann Arbor.</i>
Samuel Bovyer Laird, A.B., 1903, Pedagogy; Psychology; Sociology.	<i>Ypsilanti.</i>
James Herbert Russell, A.B., 1903, American History; European History; Sociology.	<i>Indiana, Pa.</i>

NAME	RESIDENCE
† Clara Belle Dunn, A.B., 1904, American History; Mediæval History; Rhetoric.	<i>Ann Arbor.</i>
† Grace Louise St. John Eaton, A.B., 1904, Greek; Latin Literature; Roman Institutions.	<i>Ann Arbor.</i>
† Wilbur Newton Fuller, A.B., 1904, Vertebrate Zoology; Physiological Zoology; Botany.	<i>Grand Rapids.</i>
† Minnie Olivia Hall, A.B., 1904, English Literature; Rhetoric; Aesthetics.	<i>Elsie.</i>
† Emma Melin, A.B., 1904, American History; American Literature; Mathematics.	<i>Moline, Ill.</i>
† Norman Meldrum Robertson, A.B., 1904, Chemistry; Physics; Pedagogy.	<i>Chicago, Ill.</i>
† Ralph Howard Struble, A.B., 1904, Physics; Analytical Chemistry; Mathematics.	<i>Ypsilanti.</i>
† Harriet Waterbury Thompson, A.B., 1904, Botany; Dendrology; Plant Pathology.	<i>St. Clair.</i>
† Charles Bruce Vibbert, A.B., 1904, History of Modern Philosophy; Philosophy of Religion; Hebrew.	<i>Detroit.</i>
† Bessie May Vrooman, A.B., 1904, American History; European History; English Literature.	<i>Dowagiac.</i>
† Louisa Amelia Van Dyke, A.B., 1904, Mathematics; Physics; Pedagogy.	<i>Indianapolis, Ind.</i>

Total number, 115.

A dagger (†) indicates that the student was admitted to the Graduate School at the beginning of the second semester, on completion of the requirements for the bachelor's degree, though the degree was not to be conferred until the end of the year.

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UNIVERSITY BULLETIN

NEW SERIES, VOL. VI, NO. 9. MAY, 1905

UNIVERSITY OF MICHIGAN

DEPARTMENT OF
LITERATURE, SCIENCE, AND THE ARTS

GRADUATE SCHOOL

Annual Announcement

FOR

1905-1906

Ann Arbor

PUBLISHED BY THE UNIVERSITY
1905

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE
AND THE ARTS

Graduate School

ANNUAL ANNOUNCEMENT

FOR

1905-1906

Ann Arbor

PUBLISHED BY THE UNIVERSITY
1905

CALENDAR.

1905.

- Sept. 26. **FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY.**
- Nov. — **Thanksgiving Recess of three days, beginning Tuesday evening, in all Departments of the University.**
- Dec. 21. **(Evening) Holiday Vacation begins in all Departments.**

1906.

- Jan. 9. **Exercises resumed.**
- Feb. 9. **(Evening) FIRST SEMESTER CLOSES.**
- Feb. 12. **SECOND SEMESTER BEGINS.**
- April 13. **(Evening) Recess begins, ending April 24 (evening).**
- June 21. **COMMENCEMENT IN ALL DEPARTMENTS OF THE UNIVERSITY.**

ADMINISTRATIVE COUNCIL.

JAMES B. ANGELL, LL.D., *President.*

REV. MARTIN L. D'OUGE, LL.D., *Professor of the Greek Language and Literature.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

ALBERT H. PATTENGILL, A.M., *Professor of Greek.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory.*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory.*

HENRY C. ADAMS, LL.D., *Professor of Political Economy and Finance.*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts.*

ALBERT A. STANLEY, A.M., *Professor of Music.*

FRANCIS W. KELSEY, Ph.D., *Professor of the Latin Language and Literature.*

OTIS C. JOHNSON, Ph.C., A.M., *Professor of Applied Chemistry.*

ANDREW C. McLAUGHLIN, A.M., LL.B., *Professor of American History.*

ISRAEL C. RUSSELL, C.E., LL.D., *Professor of Geology.*

WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology.*

JACOB REIGHARD, Ph.B., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum.*

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory.*

JAMES A. CRAIG, Ph.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek.*

J. PLAYFAIR McMURRICH, Ph.D., *Professor of Anatomy.*

*ROBERT M. WENDELL, Sc.D., LL.D., *Professor of Philosophy.*

*Absent on leave.

GEORGE HEMPL, PH.D., *Professor of English Philology and General Linguistics.*

ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages.*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching.*

FRED N. SCOTT, PH.D., *Professor of Rhetoric.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

FREDERICK G. NOVY, ScD., M.D., *Professor of Bacteriology.*

EDWARD D. CAMPBELL, B.S., *Professor of Analytical Chemistry.*

ALLEN S. WHITNEY, A.B., *Professor of Education.*

FILIBERT ROTH, B.S., *Professor of Forestry.*

G. CARL HUBER, M.D., *Professor of Histology and Embryology.*

FRED M. TAYLOR, PH.D., *Professor of Political Economy and Finance.*

ALEXANDER ZIWET, C.E., *Professor of Mathematics.*

WILLIAM J. HUSSEY, M.S., *Professor of Anatomy.*

FREDERICK C. NEWCOMBE, PH.D., *Professor of Botany.*

GEORGE W. PATTERSON, JR., PH.D., *Junior Professor of Electrical Engineering.*

JOHN O. REED, PH.D., *Junior Professor of Physics.*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy, and Secretary of the Administrative Council.*

JOSEPH H. DRAKE, PH.D., LL.B., *Junior Professor of Latin and Roman Law. . .*

MORITZ LEVI, A.B., *Junior Professor of French.*

WALTER DENNISON, PH.D., *Junior Professor of Latin.*

EARL W. DOW, A.B., *Junior Professor of History.*

MOSES GOMBERG, Sc.D., *Junior Professor of Organic Chemistry.*

JOSEPH L. MARKLEY, PH.D., *Junior Professor of Mathematics.*

CHARLES H. COOLEY, PH.D., *Junior Professor of Sociology.*

GEORGE REBEC, PH.D., *Junior Professor of Philosophy.*

EDWARD D. JONES, PH.D., *Junior Professor of Commerce and Industry.*

S. LAWRENCE BIGELOW, PH.D., *Junior Professor of General Chemistry.*

JULIUS O. SCHLOTTERBECK, PH.D., PH.C., *Junior Professor of Pharmacognosy and Botany.*

ANNOUNCEMENT OF THE GRADUATE SCHOOL.

GENERAL INFORMATION

The University of Michigan.

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental Announcement. In the several faculties there were in 1903-1904, 176 officers of instruction, besides numerous assistants, some of whom participated in the work of teaching, including the Summer Schools, about 3,055 students, representing 50 States and Territories, and 14 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts.

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1903-1904, 111 regular teachers and 44 assistants. The students in attendance numbered over 1,420, of whom 104 were graduates. The presence of such a number of graduate students, taken with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Libraries.

The various libraries of the University contain about 82,680 volumes, and 4,000 pamphlets, and include a number of important special collections. Among these are the McMillan Shakespeare Library, 5,441 volumes; the Parsons Library (political science),

6,076 volumes; the Goethe Library of about 1,055 volumes; and the Morris Library (philosophy), 1,100 volumes. The general reading room seats 300 readers and separate rooms are provided for advanced students to work in, with the necessary books close at hand. Under certain restrictions graduate students have access to the book rooms. The library takes 1,070 periodicals, and is open, in term time, fourteen hours daily, except on Sundays and legal holidays. During the summer vacation it is open nine hours a day during the summer session, and six hours a day for the remainder of the time.

The Laboratories.

The University has an observatory and a large number of laboratories equipped for routine instruction and for original research. The laboratories (omitting those connected exclusively with the work of the Engineering, Medical, and Dental Schools) are: the Anatomical, Botanical, Chemical, Geological, Mineralogical, Histological, Forestry, Statistical, Hygienic, Physical, Physiological, Psychological, and Zoological. For a fuller account of them and their various resources, as also of the University collections for the study of art, archæology, commerce, ethnology, mineralogy, palæontology, systematic zoology, etc., consult the annual Calendar, which may be had *gratis* on application to Mr. James H. Wade, Secretary of the University.

Societies.

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc.

For more detailed information about the libraries, laboratories, museums, and societies of the University, see the Calendar for

ORGANIZATION OF GRADUATE WORK.

The Graduate School.

The Graduate School was organized in the Spring of 1892 in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department—courses that have developed during the past few years from the continual extension of the elective system,—and to recognize and announce them as some-

thing distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of the higher work, and, so far as possible, for the separate instruction of graduate students. It also aims to lay foundations for the future development of university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council, of which the President of the University is chairman.

The regulations of the University respecting graduate work that were formerly in force, have been modified in a few particulars by the Council, and it is possible that still further changes may be made in the year to come. The more important of these regulations are explained in the pages that follow.

The University System.

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of an original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a *master's* degree. It may be added also that for the master's degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Graduate students who do not wish to work for a higher degree are admitted to any course offered in the Department of Literature, Science, and the Arts, upon satisfying the professor in charge that they are qualified to pursue the work to advantage.

THE HIGHER DEGREES.

Degrees Conferred.

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees.

A Bachelor of this University, or of any other reputable university or college, may become a candidate for a master's degree, and may be recommended for the degree after one year's residence at the University, provided he pass a satisfactory examination on the course of study approved by the Administrative Council. A thesis may, or may not, be included in the requirements for a degree, as the committee in charge of the student's work may determine.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The practice of allowing graduates of this University to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.*

A student properly qualified may be permitted to pursue at the same time studies for a master's degree and studies in any of the professional schools, on condition that the term of study and residence in the Graduate School be extended to cover at least two years.

The Doctors' Degrees.

1. The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research. The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Doctor of Science.

2. It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study, and no definite term of required residence can be specified. As a rule, three years of graduate study will be necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work.

3. No student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. [This rule may be waived in the case of those who come properly accredited from a Graduate School of some other university, and of those who, as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.]

4. A student wishing to become a candidate for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

5. A candidate for a doctor's degree must take a major study that is substantially co-extensive with some one department of instruction in the University. He must also take two minor studies, one of which may be in the same department as the major, but involving a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council.

6. THE THESIS.—The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but it must depend for acceptance more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

Special Regulations Relating to the Higher Degrees.

1. Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within one week after the opening of the semester*, the particular branches of study to which they wish to give special attention.* The supervision of their work will then be entrusted to the proper committee.

2. The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

3. The thesis must be completed and put into the hands of the

*See also next page under "Admission and Registration."

chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

4. The thesis must be prepared for close scrutiny with reference not only to its technical merits, but also to its merits as a specimen of literary workmanship. It must be preceded by an analytical table of contents, and a carefully prepared account of the authorities used.

5. The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

6. Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of his thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. He is also required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee. To guarantee the printing of the thesis, every candidate for the doctor's degree is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended.

ADMISSION AND REGISTRATION.

All applicants for admission to the Graduate School must first report to the Dean of the Department of Literature, Science, and the Arts, and present their credentials. They will then receive special blanks to be filled out, subject to the approval of the professors under whom they wish to work, and they should consult with these professors at once, in order, if possible, to report to the Secretary of the Administrative Council not later than one week after the opening of the semester. The Secretary can be found at his office in University Hall during the first week of each semester *daily*, between 12 and 1, and throughout the year *Tu.* and *Th.* at 12.

The privileges of the school are open to graduates of the Department of Literature, Science, and the Arts of this University, and to

graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School.

Graduates of institutions where the undergraduate courses of study are not substantially equivalent to the course prescribed at this University, are ordinarily required to do an additional amount of undergraduate work, or to prolong their term of residence, before being admitted to full candidacy for a higher degree.

Graduates of this University, or of other institutions, who do not wish to become candidates for a degree, may be admitted and registered as special resident graduates.

Graduates of other institutions who are candidates for a bachelor's degree in the Department of Literature, Science, and the Arts, are not registered in the Graduate School.

Students attending the Summer School, if able to meet the regular requirements of candidacy for the master's degree, may be enrolled in the Graduate School. *For particulars in regard to such enrollment see the Announcement of the Summer School.*

Students already admitted to the Graduate School must report to the Secretary of the Council within two weeks after the beginning of the academic year, if they wish to continue their studies.

FEES AND EXPENSES.

Matriculation Fee.—Every student before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or students shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for the materials and apparatus actually consumed by them. The deposits required in advance are different

in the different courses, ranging from one to twenty dollars. The laboratory expenses of students will vary with their prudence and economy. Experience has shown that in the chemical laboratory the average expense for all courses is about one dollar and twenty cents a week.

Diploma Fee.—The fee for the diploma given on graduation is ten dollars, and the by-law of the Board of Regents prescribes that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

FELLOWSHIPS.

Elisha Jones Classical Fellowship.

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University, in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President ANGELL, and Professors D'OOGHE, KELSEY, HUDSON and PATTENGILL. The period of incumbency is limited to two academic years, and must be spent at this University unless at any time the examining board shall see fit to allow the second year to be spent at some other place favorable to classical study.

No income has been available for the current year.

Fellowship in Chemistry.

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1904-1905 of the Fellowship in Chemistry established by them in

1895. Professors VAUGHAN and BIGELOW were designated to act as a committee to select the incumbent and to arrange the work in accordance with the wishes of the donors. The holder of the Fellowship for the year 1904-1905 has been William H. Lightstone, Jr., A.B.

Peter White Fellowship.

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1904-1905 by Honorable Peter White, of Marquette. The holder of the Fellowship for the year has been John Leonard Conger, A.B.

Dexter M. Ferry Botanical Fellowship.

Provision for a Fellowship in Botany, with an income of five hundred dollars, was continued for the year 1904-1905 by Mr. Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year has been Rufus Percival Hibbard, A.B.

Stearns Fellowship.

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars. The holder of the Fellowship for 1904-1905 has been Burton Samuel Knapp, B.S.

Gas Engineering Fellowship.

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of the Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for special apparatus and material required for the research. The holder of the Fellowship for the year has been David Homer Clary, B.S.

Buhl Classical Fellowship.

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1904-1905. The joint holders of the Fellowship for the year have been Robert Byrns English, A.M., and Laura Bayne Woodruff, A.M.

Rockefeller Fellowship.

The Rockefeller Institute for Medical Research has continued its grant for a fellowship in Higiene and Bacteriology for the year 1904-1905. The holder of this fellowship for the year has been Harry Norton Torrey, B.S.

Newberry Classical Fellowship.

Mrs. Helen H. Newberry, of Detroit, has given the sum of three hundred dollars for the maintenance of a fellowship in the classics during the year 1904-1905. The holder of this fellowship has been Elizabeth Ethel Sinclair, A.B.

A Classical Fellowship.

A classical fellowship with an income of five hundred dollars has been provided for the year 1904-1905 by a friend of the University. The income has been divided between Henry Herbert Armstrong, A.M., and John G. Winter, A.M.

The Charles James Hunt Fellowships.

In July, 1900, Mr. Charles James Hunt, of Detroit, a graduate of the University in the class of 1846, and wife, conveyed to the Board of Regents, in trust, the title to certain pieces of real estate, subject to Mr. Hunt's life-interest in the income to be derived therefrom, and to the life-interests of other persons named in the deed. After the termination of these life-interests "one or more fellowships in the University of Michigan" are to be established in accordance with conditions named in the deed of trust and in accompanying documents, and are to be known as the Charles James Hunt Fellowships.

Angeline Bradford Whittier Fellowship in Botany.

This Fellowship has been established by Joseph Bradford Whittier, of Saginaw, in memory of his mother. The principal sum of the endowment is four thousand dollars. The holder of this fellowship for the year 1904-1905 has been Alfred Dachnowski, A.M.

COURSES OF INSTRUCTION.

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates.

Different departments of instruction have adopted different modes of announcing the work. *For further information reference may be made directly to the head of the department concerned.*

GREEK.

The courses here announced presuppose, in general, four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Lysias, Xenophon, Homer, Demosthenes, the Tragic Poets, and Aristophanes.

FIRST SEMESTER.

Professor D'OUGE:—

Teachers' Course.

Lectures on Greek Grammar; particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week.*

Seminary in Tragedy.

Studies in Sophocles, with special reference to the dramatic art of the poet, his use of meters, and the antiquities of the Greek stage.—*Three hours a week.*

[The Oresteian Trilogy of Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet.—*Three hours a week.*

Omitted in 1905-1906; to be given in 1906-1907]. ..

The History of Greek Art from the Beginning to the Roman Period.

Gardner's Handbook of Greek Sculpture and Tarbell's History of Greek Art will be made the basis of a more general study.—*Three hours a week.*

Modern Greek. Practical introduction and practice in reading specimens of modern Greek literature.—*Three hours a week.*

[Plato and Aristotle. Selections from the *Gorgias* and the *Nicomachean Ethics*.

Omitted in 1905-1906; to be given in 1906-1907].

Professor PATTENGILL:—

Herodotus. Books VII and VIII.

Three hours a week.

Thucydides and a Study of the Peloponnesian War.

Three hours a week.

Dr. STUART:—

Greek Epigraphy.

A study of the local alphabets, and exercises in reading inscriptions.—*Two hours a week.*

SECOND SEMESTER.

Professor D'OUGE:—

[Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.—*Three hours a week.*

Omitted in 1905-1906; to be given in 1906-1907].

Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week.*

Seminary in Plato's Republic.

Two hours a week.

Lucian.

Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week.*

Modern Greek.

A practical introduction and practice in reading specimens of modern Greek literature.—*Three hours a week.*

[Aristotle's Athenian Constitution.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week.*

Omitted in 1905-1906; to be given in 1906-1907].

[Pausanias and the Topography and the Monuments of Ancient Athens.

Two hours a week.

Omitted in 1905-1906; to be given in 1906-1907].

Lectures on Ancient Greek Life.

Illustrated by means of stereopticon.—*One hour a week.*

Professor PATTENGILL:—

The Bucolic Poets. The Idyls of Theocritus, Bion, and Moschus.

Three hours a week.

Assistant Professor SANDERS:—

Greek Palæography.

Two hours a week.

Dr. STUART:—

Greek Prose Composition.

This course is intended for those who are preparing to teach Greek.—*Two hours a week.*

LATIN.

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the University collections of classical antiquities and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museum of Rome and Naples.

4. Casts of ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have lately been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 300 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmaeler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Professor KELSEY:—

Latin Seminary: Lucretius.

Open to graduate students only.—*Two hours a week, throughout the year.*

Lucretius.

Interpretations and lectures.—*Two hours a week, first semester.*

Roman Art, as studied in the Monuments.

General Introduction to Roman Archæology; lectures on Roman architecture, sculpture, and painting. This course will be illustrated by photographs, engravings, and stereopticon slides, with occasional lectures upon the casts in the Art Gallery.—*Three hours a week, second semester.*

[The Topography and Monuments of the City of Rome.

Lectures, illustrated by photographs, engravings, and stereopticon slides.—*Three hours a week, second semester.*

This course will be omitted in 1905-1906].

Professors KELSEY and DENNISON :—**Caesar's Gallic War (Teachers' Course, A).**

Lectures. Papers prepared by those taking this course. Critical study of the text of the Gallic War, on the basis of Meusel's edition; studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical study of the *Bucolics*, and selected portions of the *Georgics*, *Aeneid*, and *Appendix Vergiliana*, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DRAKE :—**Roman Literature.**

Interpretation of selections from representative authors, from Ennius to Boethius; lectures.—*Four hours a week, first semester.*

General Course in Roman Literature.

Lectures and Topical Studies. This course is designed for students interested in the general subject of literature, who do not wish to make an intensive study of Latin. No knowledge of Latin is required. The Roman literature will be treated in its broad relations to the Greek literature and to modern literature.—*Two hours a week, first semester.*

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparisons.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law as given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law, which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, first semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

Professor DRAKE and Dr. MEADER:—

Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Professor DENNISON:—

[Latin Inscriptions.]

Reading of inscriptions of different periods from the De Criscio collection and from reproductions. Interpretation of selected inscriptions.—*Two hours a week, second semester.*

This course will be omitted in 1905-1906].

Martial; Petronius, Trimalchio's Banquet.

With special reference to the private and social life of the Romans.—*Two hours a week, first semester.*

The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century.—*Two hours a week, second semester.*

[The Letters of Cicero.

Interpretation of selected letters, with special reference to Roman manners and political conditions at the end of the Republic. *Two hours a week, first semester.*

This course will be omitted in 1905-1906].

The Private Life of the Romans.

Lectures on Roman life and the social conditions of antiquity; illustrated by stereopticon slides.—*One hour a week, first semester.*

Professor DENNISON, Assistant Professor SANDERS, and
Dr. MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

The Sources of the Roman Historians.

Lectures with direction of work on special themes.—*One hour a week, first semester.*

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Virgil, Georgics.

Reading course with lectures on the Roman writers concerning agriculture.—*Two hours a week, second semester.*

Lectures on Classical Mythology.

The course will include development of myths, literary parallels and interpretations based on the monuments. Illustrated by photographs and stereopticon slides.—*One hour a week, second semester.*

Assistant Professor SANDERS and Dr. MEADER:—

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Dr. MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

[The Pseudo-Cæsarian Bellum Africanum and Bellum Hispaniense.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1905-1906].

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

SANSKRIT AND COMPARATIVE PHILOLOGY.

Before beginning the study of Sanskrit, the student should have pursued courses in two of the three subjects, Greek, Latin, and German for at least four semesters. The courses in Comparative Philology are open to students of modern as well as of ancient languages.

Dr. MEADER :—

Beginners' Course.

Grammar and exercises in translation and composition. Text-books: Whitney's Grammar and Lanman's Sanskrit Reader.—*Two hours a week, first semester.*

Advanced Courses.

A. Interpretation of the selections contained in Lanman's Sanskrit Reader, with elementary studies in the comparative morphology of the more important cognate languages.—*Two hours a week, second semester.*

B. Rapid Reading of Easy Sanskrit.—*One hour a week, first semester.*

C. Advanced Reading: Kalidasa's Cakuntala. Elements of Prakrit.—*One hour a week, second semester.*

[D. Advanced Reading: Selections from the Vedas.—*One hour a week, second semester.*

This course is omitted in 1905-1906].

Comparative Philology.

A general introduction to comparative Indo-European and classical philology. Study of the relationships, classifications and general characteristics of the Indo-European languages, and discussion of the main questions of comparative phonology, morphology and syntax. *A knowledge of Sanskrit is not required.* Lectures and recitations. *One hour a week, throughout the year.*

SEMITICS.

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of "classical" and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

Professor CRAIG:—

Hebrew.*

1. Genesis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzsch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

2. Deuteronomy,

Joshua, I Samuel, Ruth, Jonah. Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

3. Prophetic Literature:

Amos and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

4. The Book of Job,

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

Assyrian.

1. Introduction to Easy Historical Inscriptions

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

2. Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Second semester.*

3. The Babylonian Stories of Creation,

The Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians. Inscription of Tiglath-pileser, I, circa 1120 B. C.—*Two hours a week, first semester.*

4. Religious Literature.

King's "The Prayers of the Lifting-up of the Hand." Craig's "Religious Texts."—*Second semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

History and Archæology.

- (1) Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

- (2) Lectures on the History of Israel and Judah
From earliest times to the Reformation of Ezra.

- (3) Lectures. Introduction to the Study of the Old Testament.

- (4) Lectures. Study of the Prophetic Books of the Old Testament.

- (5) Lectures. The Religion of the Semites.

- (6) Lectures. The Wisdom Literature of the Jews and Comparison with similar productions by other peoples.

Arabic.

1. Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

2. Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

Aramaic, Syriac, Ethiopic.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

Hellenistic Greek.

Professor CRAIG:—

New Testament.

The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

Septuagint.

I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

FRENCH.

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1904-1905.

Professor CANFIELD:—

Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Three hours a week, throughout the year.*

[The History of the Novel in France.

This course will trace the growth of the novel as a form of literature and its various transformations. A number of representative masterpieces of different periods will be read, and both their technical qualities and their relation to the social and intellectual environments of the time will be studied. Particular attention will be given to the preparation and development of the movement of realism in the nineteenth century. Open to graduates and undergraduates.—*Three hours a week, throughout the year.*

Omitted in 1905-1906.]

Seminary in French Literature.

The early works of Victor Hugo. Various questions with regard to the sources, structure, style, etc., of these works will be examined.—*Two hours a week, throughout the year.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth, and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor DE PONT:—**Dramatists of the Eighteenth Century.**

Lectures and reports. This course is designed to furnish a survey of the French drama from the Classical to the Romantic School. For undergraduates and graduates.—*Three hours a week, second semester.*

Assistant Professor EFFINGER:—**The Dramatic Literature of the Nineteenth Century.**

The Drama of the Revolution; the Melodramatic Period; the Romantic Movement; the Modern Drama. Lectures, reading, and reports.—*Three hours a week, throughout the year.*

Dr. THIEME:—**French Versification.**

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

Dr. HAMILTON:—

Introduction to the Literature of the Old French period, reading of Old French texts.—*Two hours a week, first semester.*

PROVENÇAL.**Dr. HAMILTON:—**

Outline of the Grammar, with readings in Appel's *Provençalische Chrestomathie*. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN.

The minimum requirement for admission to the courses announced below consists in courses 1 and 2 described in the University Calendar for 1904-1905, or an equivalent.

Professor LEVI:—**Dante: La Vita Nuova.**

For undergraduates and graduates.

Dante: La Divina Commedia.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH.

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, described in the University Calendar for 1904-1905, or an equivalent.

Dr. WAGNER:—

Don Quixote.

In this course the masterpiece of Cervantes will be critically read and the manifold aspects of its significance studied.—*Two hours a week, second semester.*

Lope de Vega and the Classical Drama.

Representative masterpieces of the drama of the seventeenth century will be read and interpreted.—*Two hours a week, second semester.*

Outline of the History of Spanish Literature.

Lectures intended to accompany the foregoing courses and to offer such a view of the more important movements in Spanish literature that the works studied in them may be seen in their proper historical perspective.—*One hour a week, throughout the year.*

GERMAN.

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 10, and options in 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8, as described in the University Calendar for 1904-1905, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas's edition. The drama is studied as a work of art, and the life and thought of Goethe, affording the basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature in the second half of the Nineteenth Century.

Lectures, assigned readings and discussions.—*Two hours a week, the second semester.*

Proseminary in Modern German Literature.

The Storm and Stress Movement.

Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Heinse, etc. The chief aim of this course is to acquaint the student with the methods of modern literary research. Primarily for graduates.—*Two hours a week, the first semester.*

Teachers' Course.

Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

Assistant Professor DIEKHOFF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of Modern German phonology and inflection. The selections read

are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into Modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1905-1906; to be given in 1906-1907].

Assistant Professor HILDNER:—

Hans Sachs.

Lectures and reports.—*Two hours a week, second semester.*

Dr. FLORER:—

The Early Writings of Lessing.

Lectures, investigations, and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Life and Works of Luther.

Lectures and reports. Special attention is paid to Luther's language. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Dr. BOUCKE:—

The history of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and to give a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

GOTHIC.

Assistant Professor DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN.

Dr. BOUCKE:—

[Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

Omitted in 1905-1906; to be given in 1906-1907].

JOURNAL CLUB:—

Current Literature on Germanic Philology and Literature.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year, at which reports are made on the important contributions to Germanic philology and literature.

ENGLISH PHILOLOGY AND GENERAL LINGUISTICS.

The work of this department is concerned with the study of (1) the mother tongue, (2) the life and growth of language in general, and (3) the teaching of language.

Professor HEMPL:—

Old English.*

A general introduction to the subject.—*Two hours a week, first semester.*

[Old-English Phonology and Morphology.

This course consists of lectures on the history of Old-English sounds and forms, together with the private reading of Old-English prose texts and the investigation of two or three problems.—*Two hours a week, second semester.*

Omitted in 1905-1906].

Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

Middle English.

This course consists of a brief introduction to the subject, the private reading of several of Chaucer's works, and the study of Chaucer's English as compared with the English of to-day.—*Two hours a week, first semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

*The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

English Etymology.

A study of the origin of English words and of the changes they have undergone in form and meaning.—*Two hours a week, first semester.*

Modern-English Grammar.

This course is intended especially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

Special Problems.

This course consists in the investigation of a series of special problems in English philology, dealing chiefly with the historical development of certain phases of English speech.—*Two hours a week, each semester.*

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

The Teaching of Modern Foreign Languages.

It is the object of this course to give practical instruction in the teaching of modern foreign languages, as well as advice in the matter of preparation for teaching. There will also be given a brief survey of the most important methods now employed.—*Two hours a week, second semester.*

The Principles of Linguistic Science.

Lectures on the most important phases of the life and growth of language. It is the object in this course to furnish to students of either classical or modern languages an explanation of the phenomena of the languages they are studying, and to bring these scattered data into connection with the underlying principles.—*Two hours a week, second semester.*

ENGLISH.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The Development of the English Novel; The English Satirists of the Seventeenth and Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

See also the courses in English Philology and General Linguistics.

Professor DEMMON, Assistant Professor STRAUSS, and
Dr. TATLOCK :—

English Literature. The Thirteenth and Fourteenth
Centuries.

This course is open to those only who take, or have taken, a course in Chaucer. It will deal mainly with pre-Chaucerian Middle English literature, and will consist in lectures and outside reading (mainly of modernized texts), with the purpose of illustrating Chaucer and the Middle Ages.—*First semester.*

English Literature. From Chaucer to the Renaissance.

This course consists in lectures and outside reading on Chaucer, Gower, Langland, Mandeville, Malory, Skelton, the Scottish poets of the Fifteenth and Sixteenth Centuries, and other writers, and on the native origin of the English Drama.—*Second semester.*

English Literature Seminary.

Each student is expected first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Areopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book 1; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Browning's The Ring and the Book; Tennyson's Maud; Swinburne's Atalanta in Calydon.—*First semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; Richard III; the two parts of Henry IV; Henry V; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth; Cato.—*Second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover

the distinctly American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*Throughout the year.*

Studies in the text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

RHETORIC.

It is expected that graduate students will be reasonably proficient in writing. The study of composition, therefore, unless it is pursued with reference to the theory of teaching, is not regarded as a graduate study.

Professor SCOTT:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

[Prose Rhythms.

The purpose of this course is the careful study and discussion of the principal theories regarding the nature and origin of typical English prose rhythms. A parallel study will be made of poetic rhythms for purposes of comparison.—*One hour a week, first semester.*

Omitted in 1905-1906.]

Newspaper Writing: Theory and Practice.

Intended for students who are preparing to do newspaper work. The class will prepare and publish, in the course of the semester, several issues of a daily paper.—*Two hours a week, first semester.*

Seminary in Rhetoric and Criticism.

The subjects of discussion will vary from year to year. Among the problems to be investigated are the following: The origins of prose; types of critical theory; the theory and history of communication; the psychology of figure of speech; the sociological basis of the principles of usage; the morphology of publication; the rhythm of prose; the nature and origin of the types of discourse.—*Two hours a week, throughout the year.*

Teachers' Course: Methods of Teaching English Composition and Rhetoric.

The course includes (1) an outline of the underlying principles of rhetoric and composition, (2) a consideration of the problems of composition teaching, (3) a review of modern text-books, (4) a discussion of methods of teaching as outlined in the literature of the subject. Each member of the class is required to do some teaching.—*Two hours a week, second semester.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

The course is conducted as a seminary.

[Reviews.]

The aim of this course is to furnish instruction, and give practice, in the writing of book-reviews for newspapers and magazines. During the semester the class will edit and publish several issues of a weekly review. A few lectures on standards of criticism and methods of reviewing will be given at the beginning of the semester, and specimen reviews will be analyzed in detail.—*Two hours a week, second semester.*

Omitted in 1905-1906.]

ORATORY.

Professor TRUEBLOOD:—

Study of Great Orators, ancient and modern.

Lectures on methods of public address and sources of power. Study of representative selections. The method is similar to that in the English Literature Seminary.—*One semester.*

Oral Discussions.

This course is designed to develop readiness of extemporization. It involves the application of the principles of logic and elocution in the discussion of leading topics of the day. Students are required to present briefs of the subjects discussed.—*Throughout the year.*

Shakespearean Reading.

Critical study and interpretive readings of four plays. Analysis of character, plot, and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes recited from the platform. Plays to be selected.—*Throughout the year.*

MUSIC.

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnish ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the largest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

First Group.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

Second Group.

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY.

Professor HUDSON :—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russian on the Pacific and in Central Asia, the attitude of the powers toward China, the partition of Africa, and the problems raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

Two hours a week, throughout the year.

The course given the first semester deals with the history of England since the formation of the first Gladstone ministry, with especial reference to the policy and measures of Gladstone and Disraeli. During the second semester a study is made of England as a colonial power.

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor Dow :—

Studies in Medieval and Early Modern European History.

Two hours a week, throughout the year.

This work consists of courses which extend over two years, and may be elected two years in succession. Courses 9a and 10a relate to the history of France, and chiefly to institutions. In the first semester a study is made of the institutions of the feudal period; in the second, attention is directed to changes that took place in the later medieval and early modern period. Courses 9b and 10b (9b the first semester and 10b the second) treat of the period of the Renaissance and the Reformation, and consist, like the other two, of a series of logically related special studies. The aim of the work, aside from gaining an intensive knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied especially in preparing oral and written reports.

Seminary in Medieval History.

Two hours a week, throughout the year.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatic, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.

Assistant Professor CROSS:—

Studies in English History since the Reformation.

Two hours a week, throughout the year.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which primarily concerns with the separation from Rome under Henry VIII, and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the Church are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689. Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents. The course for 1905-1906 deals with the Restoration and the Revolution of 1688.

Assistant Professor FAIRLIE:—

National Administration.

This course is a study of the national administration of the United States, compared with that of the principal European countries. It begins with an examination of the administrative powers of the President and Senate and those of other chief executives and executive councils. Each of the nine Executive Departments in the United States government and the various administrative services connected with them will be considered and compared with the corresponding departments and services in other governments. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service, and in comparison with the systems of professional training and examinations in Great Britain, Germany and France. A brief survey

will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the working of the governmental machinery, will be investigated and discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, first semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, second semester.*

Comparative Administrative Law.

In this course, special attention will be given to English local administration, showing the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the combination of bureaucratic and popular administration in Prussia, and the sys-

tem of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Three hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, method of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties and their machinery, recent legislation concerning primaries, reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Seminary in Administration.

These are courses for original research on special topics. During the year 1905-1906 a study will be made of State administration in Michigan. Special arrangements may also be made with students for work on other topics.—*Two hours a week, each semester.*

Additional advanced courses in Administrative Law are offered in the Law Department, viz.: Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

AMERICAN HISTORY.

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extend-

ing over two years and a half, beginning with lectures on colonial history, and ending with a seminary in which special problems are investigated in original material. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American history, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history. A number of short courses of lectures by various well-known writers and teachers from other universities has been provided for the year 1905-1906.

American Colonial History.

Three times a week, second semester.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.

History of the Civil War and the Period of Reconstruction.

Three times a week, first semester.

Chief emphasis is laid on constitutional and political questions of the time, such as causes of secession, legal justification of secession, war powers of the President, methods and plans of reconstruction, etc., but military movements are not neglected.

Constitutional and Political History of the United States, 1775-1861.

Three times a week, throughout the year.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully of the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort also is made to trace the political and social development of the country.

Seminary in American History.

Two hours a week, throughout the year.

This course is primarily for graduate students who have already done a great deal of historical work. The object is to give training in the investigation of historical problems, to the handling of original material, and in the proper presentation of reports. In 1905-1906 the period studied will be that of the preliminaries of the Revolution. Graduate students will receive individual attention and assistance in the prosecution of their investigations.

Studies in American History.

Two hours a week, throughout the year.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Written reports are prepared under the direction of the professor. Special facilities are given for the use of the library.

PHILOSOPHY.

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Biology, Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

A. SEMINARIES.

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professor LLOYD, Mr. VIBBERT and Mr. SELLARS.

History of Philosophy, Professor LLOYD.

Ethics, Professor LLOYD, Mr. VIBBERT and Mr. SELLARS.

Modern Systems, Professor LLOYD and Mr. VIBBERT.

Ancient Philosophy, Professor REBEC, Mr. VIBBERT and Mr. SELLARS.

Philosophy of Religion, Mr. SELLARS.

Æsthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD, Mr. VIBBERT and Mr. SELLARS.

Logic, Professor REBEC.

Psychology, Rational and Experimental, Assistant Professor PILLSBURY and Mr. SHEPARD.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been removed to the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY.

Professor LLOYD, Mr. VIBBERT, and Mr. SELLARS:—

***The Philosophy of Kant.**

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

***The Philosophy of Hegel.**

Study of the Logic and discussions.—*Two hours a week, second semester.*

***Philosophy since Hegel.**

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Professor REBEC and Mr. SELLARS:—

***American Ideas.**

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

***Plato's Republic.**

Collateral reading and theses.—*Two hours a week, first semester.*

C. ETHICS.

Professor REBEC and Mr. VIBBERT:—

***Aristotle's Ethics.**

Collateral reading and theses.—*Two hours a week, second semester.*

D. PSYCHOLOGY.

The Psychological Laboratory is well equipped for original investigation; and its facilities have been improved since 1904, when a new building was occupied.

Assistant Professor PILLSBURY and Mr. SHEPARD:—

Original Investigation.

Hours as may be assigned, throughout the year.

E. SPECIAL COURSES.

Mr. SELLARS:—

Philosophy of Religion.

Two hours a week, first semester.

Professor LLOYD, Mr. VIBBERT, and Mr. SELLARS:—

Political Philosophy.

A critical study of society of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1905-1906 to the question of the possibilities of a realistic expression.—*Two hours a week, first semester.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1905-1906 to the philosophy of evolution.—*Two hours a week, second semester.*

Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

THEORY AND HISTORY OF ART, AND ARCHÆOLOGY.

A. THEORY OF ART.

Professor REBEC:—

Æsthetics.

Two hours a week, first semester.

Elect in the Department of Philosophy.

Principles and Problems in Æsthetic History.

Two hours a week, second semester.

Elect in the Department of Philosophy.

Seminary in Æsthetics.

Elect in the Department of Philosophy.

Professor WINKLER:—**Lessing's Laokoon.**

Two hours a week, second semester.

Elect in the Department of German.

Schiller's Æsthetics.

Two hours a week, first semester.

Elect in the Department of German.

Professor SCOTT:—**Interpretations of Literature and Art.**

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

B. ART AND ARCHÆOLOGY.**Professor CRAIG:—****Interpretation of the Monuments of Babylonian and Assyrian Art.**

Illustrated lectures.—Two hours a week, first semester.

Elect in the Department of Semitic Literature and History.

Professor D'OUGE:—**History of Greek Art.**

Three hours a week, first semester.

Elect in the Department of Greek,

Professor KELSEY:—**The Topography and Monuments of Ancient Rome.**

Three hours a week, second semester.

Elect in the Department of Latin.

Roman Art.

Illustrated lectures.—Three hours a week, second semester.

Elect in the Department of Latin.

THE SCIENCE AND THE ART OF TEACHING.

Professor PAYNE:—

History of Education, Ancient and Medieval.

Recitations and lectures. Text-book: Compayré's History of Pedagogy.—*Three hours a week, first semester.*

Graduate Seminary.

A critical study of Spencer's Education.—*Two hours a week, first semester.*

History of Modern Education.

Recitations and lectures. Text-book: Compayré's History of Pedagogy.—*Three hours a week, second semester.*

Graduate Seminary.

A critical study of Herbart's Pedagogy.—*Two hours a week, second semester.*

Professor WHITNEY:—

Theoretical and Critical Pedagogy.

The psychological principles underlying the art of teaching, the formation of the courses of study and the social institutions. Text-book: Harris's Psychologic Foundations.—*Three hours a week, first semester.*

Philosophy of Education.

Recitations and lectures. Text-book: Rozenkranz's Philosophy of Education.—*Two hours a week.*

Social Education.

This course embraces a consideration of the school as a social factor in its relation to the child, the home, the state and the church. Also a discussion of the relation of education to vocation and crime. Lectures and recitations.—*Two hours a week, second semester.*

POLITICAL ECONOMY AND SOCIOLOGY.

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy" or "Social and Industrial Reforms." For description see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in con-

nection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as "Graduate Courses" are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions.—*Two hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. For the first semester the seminary will investigate the special problems in transportation; for the second semester special problems in social reform.

Professor TAYLOR:—

Principles of Finance.

In this connection the word Finance is used in the technical rather than the popular sense. That is, it does not include Money, Banking, Stock Speculation, or any of the allied topics, but is rather concerned with those operations which are involved in

meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial consideration, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to Taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the Media of exchange, including Money and its various Credit Substitutes. This is followed by a study of the Natural Laws governing monetary phenomena, such as those which fix the Monetary Standard, those regulating the Movement and Distribution of Money, and so on. Next comes a sketch of Monetary History,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking Instruments and Operations. This is followed by a study of banking Principles,—the natural laws which regulate the safety of banking, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the History of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the Nature of Capital, the Origin of Interest, the Laws of Value, and so on. The work of the class hour includes

the discussion of readings assigned to the class generally and of reports on readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of Economic Theory, and so on.—*Two hours a week, second semester.*

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements and other sociological questions of present interest.

The class is supplied with a list of about fifty topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

The Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order*, Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field will be used. This course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, throughout the year.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient.—*First and second semesters.*

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States.

The latter part of the semester is occupied with studies in the industries connected with American agriculture, forestry and mining.—*Three hours a week, first semester.*

The Manufactures of the United States.

The history, methods, present location and condition of our chief manufacturing industries will be presented, the relation of these industries to one another, and to sources of raw materials, means of transportation, market facilities, and foreign trade.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, known as middlemen, who are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

After a preliminary consideration of the institutes of commerce, the systems used in marketing grain, cotton, tobacco, live stock, dairy products, fruits and wool are studied.—*Two hours a week, first semester.*

b. The Manufacturer's Problem of Distribution.

Two hours a week, second semester.

c. Wholesale Trade.

A detailed account of the principles and practices of modern wholesale trade.—*Two hours a week, first semester.*

d. Retail Trade.

The department store is given special attention.—*Two hours a week, second semester.*

Assistant Professor GLOVER:—

Mathematics of Insurance.

In connection with the course in Higher Commercial Education six courses are offered upon the actuarial phases and technique of insurance. The theory of the valuation of securities is also presented. For students in this line a statistical laboratory equipped with all necessary computing machines is available. For further information regarding courses in insurance see this Announcement under Mathematics.

A course of lectures on Insurance Law given in the Law Department is open to students in the Department of Literature, Science, and the Arts by special arrangement.

Doctor SMALLEY:—

Corporations.

This course undertakes a study of corporations as a phase of industrial society. It considers the functions of the promoter and underwriter, the organization of corporations under general laws, corporate securities and management, receiverships and reorganizations. It pays particular attention to those problems—such as promoter's liability, over-capitalization, protection of minority interests, corporation wrecking, etc.—to which the growth of corporations has given rise, and discusses the various programs of public supervision and control.—*Two hours a week, first semester.*

Government Control of Industry.

The aim of this course is to consider industrial regulation from the legal point of view. A study is made of the power of government, under our constitutional system, to control industrial action.

This involves, in the main, a discussion of the legal doctrines of the police power and of public policy, as far as they are of economic importance, special attention being paid to their bearing upon the solution of the problems of Labor and Capital, Trusts, Railroads, and so forth.—*Two hours a week, second semester.*

INTERNATIONAL LAW.

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

MATHEMATICS.

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with reference to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with reference to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—**Advanced Mechanics.**

This course forms a direct continuation of the course in elementary mechanics; it is mainly devoted to the dynamics of a rigid body.—*Three hours a week, second semester.*

Projective Geometry.

This course begins with the pure geometry of position, Reye's work being used as a text; this is followed by the analytic treatment, with the aid of homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Assistant Professor GLOVER:—**Higher Algebra.**

The more important topics to be considered in this course are: symmetric functions of the roots, resultants, solution of a system of n linear equations, theorems concerning integral functions of one and two variables, elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Dr. PIERCE:—**Differential Geometry.**

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—**Theory of Numbers.**

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Goursat's Cours d'analyse mathématique.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Beginning with simple problems in attraction, the course develops the fundamental properties of the potential function; then the general theory of vector fields is discussed and applied to some particular branch of mathematical physics.—*Three hours a week, first semester.*

Harmonic Analysis.

Two hours a week, either first or second semester.

Professor MARKLEY:—

Theory of Functions.

The first part of this course deals with functions of real variables in which are developed the fundamental ideas of irrational numbers, continuity, and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometrical representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

Theory of Functions. [Advanced Course.]

This course is a direct continuation of the preceding. It includes the theory of elliptic functions.—*Two hours a week, throughout the year.*

Assistant Professor GLOVER:—**Seminary in Insurance.**

This course is designed for graduate students who wish to study some of the more advanced problems relating to life contingencies. The following, among others, will be considered: Lexis' theory of population, old age pensions, sickness insurance, theory of risk, Pearson's method of moments, theory of correlation, graduation of mortality and sickness tables, theory of selection, and distribution of surplus.

Hours to be arranged, throughout the year.

PHYSICS.

The courses announced below presuppose about one and a half years' collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for a half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—**Electricity.**

Two hours a week, first semester.

An intermediate course based on J. J. Thomson's Electricity and Magnetism.

Electrochemistry:

Three hours a week, second semester.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.

Professor REED:—**The Theory of Sound.**

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude,

and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—Lectures, *two hours a week*; laboratory work, *twice a week*, *first semester*.

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week*, *second semester*.

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week*, *first semester*.

Professor PATTERSON :—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distribution, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week*, *first semester*; *twice a week*, *second semester*.

NOTE: For courses in Applied Electricity, see Electrical Engineering in the Announcement of the Department of Engineering. Fifteen courses in all are there described in detail. They cover the theory, testing and design of electric machinery, transformers, lamps, storage batteries, telegraphy, telephony, electric distribution, power plants, railways, etc.

Alternating Current Phenomena: Steinmetz.

Two hours a week, *second semester*.

The course includes the application of complex quantities to the study of alternating current phenomena, and is accompanied by a course in laboratory work in which the conclusions are verified.

Dynamo-Electric Machinery.

Lectures, *twice a week*; laboratory work, *once or twice a week*, *second semester*.

• Alternating Currents.

Lectures, *twice a week*; laboratory work, *once or twice a week, first semester*.

The courses in Dynamo-Electric Machinery, Alternating Currents, and Alternating Current Phenomena form a graded series covering the theory of dynamo-electric machines, alternate current working, transformers, and alternating current phenomena as applied to generators, distribution of power, and induction motors.

Dr. RANDALL:—

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, first semester*.

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations *two hours a week, second semester*. This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of those principles to numerous problems in physics and chemistry.

Dr. SMITH:—

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a very thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester*; *three times a week, second semester*.

PROFESSOR CARHART AND PROFESSOR REED:—

Physical Colloquium.

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

CHEMISTRY.

Resident graduates, registered under the provisions of Admission and Registration given on page 10, may enter upon any of the courses in chemistry in this University for which they are qualified. A full description of these studies can be obtained in the ANNOUNCEMENT OF COURSES OF CHEMISTRY, issued separately. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to the following named undergraduate courses in this University (University Calendar for 1904-1905; Courses 1 and 2, Courses 3 and 5, Course 7, —making in all about twenty-five hours of undergraduate credit.* If chemistry is taken as a minor subject in work registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1 and 2, the opening courses in general chemistry.

Candidates for a doctor's degree, in addition to the requirements above specified, must have satisfied the committee in charge of their studies as to their fitness to enter upon the higher work. A reading knowledge of German and French is necessary.

Graduate students who are not in work for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for convenience of the readers. A list of the sets of periodicals is given in the Announcement of Courses in Chemistry, referred to above. Chemical technology, metallurgy, sugar chemistry, phyto-chemistry, food analysis, and pharmacology, are provided for.

A. GENERAL AND PHYSICAL CHEMISTRY.

Professor ————:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during the semester.

Chemical Literature: Journal Club.

The Journal Club discusses current chemical literature. It is under the direction of Professor ————; the professors, instructors, and assistants in the laboratory take part therein. All of the prominent journals are divided among the participants, who report on the most interesting topics in rotation.—*One hour to one and one-half hours a week, throughout the year.*

Laboratory Research.

The work may be either organic or inorganic, and the student is at liberty to select one from a number of topics proposed. The work includes the study of the literature bearing upon the topics. In order to accomplish results the student should have at least five clear half days a week to devote to the work. This statement applies to all research courses.—*Hours arranged with instructor, throughout the year.*

Professor BIGELOW:—

Laboratory Research in Physical and Electrochemistry.

Hours arranged with instructor.

Laboratory Research in Inorganic Chemistry.

Hours arranged with instructor.

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Hours arranged with instructor.

Assistant Professor HULETT:—

Physical and Theoretical Chemistry.

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—*Lectures, four hours a week, second semester.*

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and Electrochemistry.—*Lectures, three hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies of solutions, dissociation, conductivity, polariscope, spectroscope, etc.—*Four times a week, both semesters.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposition potentials, etc.—*One lecture and two laboratory periods a week.*

Thermometry.

Calibrations and high temperature; measurements by all standard methods.—*One lecture and one laboratory period a week.*

Theory and Practice of Exact Measurements, with laboratory practice in glass blowing, calibration, and construction of apparatus.—*One lecture and two laboratory periods.*

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Hours arranged with instructor.

Stereochemistry, including a General Study of Isomerism.

Lectures, twice a week, first semester.

B. ORGANIC, INDUSTRIAL AND ANALYTICAL CHEMISTRY.

Professor JOHNSON:—

Qualitative Analytical Chemistry.

Following undergraduate Course 3 (University Calendar for 1904-1905) or its equivalent. Laboratory work, including electrical methods, with personal instruction, *hours arranged with instructor.*

Professor CAMPBELL:—

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1904-1905) or its equivalent. Laboratory work directed by lectures in any of the three courses, namely: (1) Advanced quantitative methods in general, (2) the analysis of minerals, (3) iron and steel analysis. Electrolytic methods are much employed, and there is a room devoted to their use.—*Hours arranged with instructor, throughout the year.*

Investigation in Analytical Method, Inorganic Structure, and Metallurgical Chemistry.

Laboratory work upon questions related to researches published from the department. Use is made of Le Chatelier's pyrometer. Special work is given in micrometallography, as bearing upon the constitution of metals and their alloys.—*Hours arranged with instructor, throughout the year.*

Professor CAMPBELL and Assistant Professor WHITE:—

Technical Methods and Investigations. Laboratory work as follows:—

- (1) Gas Analysis, Calorimetry, and Photometry.
- (2) Technical examination of Gold and Silver Ores.
- (3) The Cement Industry, with special reference to influence of composition and temperature of burning.
- (4) Coal, gas, and by-products.
- (5) Influence of heat and mechanical treatment on constitution of iron and steel.
- (6) The chemistry of beet sugar, with special reference to its manufacture.

Other subjects may be chosen after consultation.—*Hours arranged with instructor, throughout the year. In (2) the work must begin in first semester.*

Professor GOMBERG:—

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, the first semester.*

Seminary in Special Topics in Organic Chemistry.

Following undergraduate Course 7 (University Calendar for 1904-1905) or its equivalent.—*Two times a week, second semester.*

Organic Synthesis and Ultimate Analysis.

Laboratory work.—*Hours arranged with instructor, throughout the year.*

Investigation in Organic Chemistry.

Laboratory work.—*Hours arranged with instructor, throughout the year.*

Assistant Professor SCHLOTTERBECK:—

Phytochemical Research.

The chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.—*Laboratory work, throughout the year.*

Assistant Professor WHITE:—

Chemical Technology.

Lectures on the main chemical industries, inorganic in the first semester, and organic in the second semester. Among the subjects treated are the alkali and acid industries, cements, wood and coal distillations, beet sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Dr. DUNLAP :—

Organic Analysis.

The technical examination of various organic industrial products, such as oils, fats, waxes, food-stuffs, etc. For those having sufficient preparation, this course may be taken as a research course on some organic-technical problem.—*Hours to be arranged by consultation. Given both semesters.*

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY.

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN :—

1. Food Analysis.
2. Water Analysis.
3. Research on the Chemistry of Bacteria.

Students doing graduate work in these subjects will be required to work in each subject for at least one year.

Professor NOVY :—

1. Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1903-4.—*Hours arranged with instructor, either first or second semester.*

2. Pathogenic Protozoa.

A study of the distribution and means of transmission of the protozoal diseases. The laboratory work will cover the diagnostic and cultivation methods and such work with the insect hosts as will be practicable.

3. Advanced Physiological Chemistry.

Laboratory work and reading.—*Hours arranged with instructor, either first or second semester.*

ASTRONOMY.

The work in Astronomy will be under the direction of Professor William J. Hussey, M.S., but it can not now be announced in detail. For an account of the Astronomical Observatory and its equipment see the Calendar of the University for 1904-5.

MINERALOGY.

The courses in mineralogy presuppose a knowledge of general inorganic and analytical chemistry, as well as the principles of general geology.

The mineralogical laboratory is well equipped with working collections of crystals, crystal models, minerals, goniometers and polarizing microscopes. A good museum collection of minerals is of easy access to the laboratory. Although the determination of the minerals in the various courses is based mainly upon their physical properties, the facilities of the department are such that blow pipe and other tests may be readily made.

Assistant Professor KRAUS:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.

Lectures five times a week; laboratory work, five hours a week, second semester.

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by both the physical and chemical properties a large number of minerals.

Laboratory work, six hours a week, first and second semesters.

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer.

Laboratory work, nine hours a week, first and second semesters.

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, or the formation and origin of minerals.

GEOLOGY.

The course of instruction in geology for undergraduates, as announced in the University Calendar, embraces from two to three years University work. The first year is devoted to elementary studies in physical geology, historical geology, and physical geography, giving three hours a week to each for one semester. During the second year more detailed instruction is given, two hours each week, in the same general subjects. Each student is given a special subject for investigation in connection with which a thesis of about 2,500 words is required. During the second semester palæontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary courses have been pursued. Those who have done more work than is represented by the elementary course may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of geology will be read with special reference to Pleistocen geology, and to the origin and classification of topographic forms, glacial records, lake histories, volcanoes, erosion, and other processes by which the surface of the earth has come to have its present form.

The museum contains a series of fossils selected to illustrate the geological history of North America. This collection is intended especially for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lectures will be returned to the cases in the museum, where they will be available for examination at any time.

There is a second collection embracing ten thousand specimens of both American and European fossils, which is arranged zoologically and intended for the use of advanced students in palæontology. Special collections of rocks, brachiopods, corals, etc., numbering from one hundred and fifty to two hundred specimens each, are arranged in the geological laboratory for the immediate use of students.

The collection in physical geology contains a well selected series of specimens to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them in cases provided and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopes and

photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

The work in geology is conducted by, or under the direction of, Professor RUSSELL.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given in the University Calendar for 1904-1905. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a *minor for the master's degree* will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctorate a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a *major for the doctor's degree* are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a *minor study*, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptation. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours per week, throughout the year.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Dr. HOLMES:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the

instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.

This is a year's course, but is so divided that the two parts are given in the first semester of alternate years. Course 4a deals with Protozoa, coelenterates, worms, crustaceans, and several smaller groups. Course 4b includes molluscs, echinoderms, myriapods, arachnids, and insects.

Course 4b will be given in 1905-1906.—*Four hours, first semester.*

Systematic Zoology: The Crustacea.

Students will work on the local fauna.—*Two or three hours a week, throughout the year.*

Morphogenesis.

This course consists of lectures and discussions on the factors of development, regeneration, and the general subject of form-regulation. Results of experimental work in embryology will be discussed in relation to the theories of development that have been advanced. Open to students who have taken Course 3, in Embryology or other work which affords an adequate preparation for the study of the subjects treated.—*One hour, first semester.*

Evolution Problems.

Lectures, reading, and conferences. This course aims to give a critical appreciation of the development of the evolution theory since Darwin and of the bearing of that development on other fields of knowledge. The theory of evolution has so profoundly influenced psychology, ethics, and social science, to say nothing of other fields, that an acquaintance with the ground and import of this theory is a necessary part of the equipment of the student in any of these fields, as well as of the biologist who has an interest in the broader aspects of his subject. It is the purpose of the course to give the student the necessary basis for appreciating in some degree the import of biology.—*Two hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in

photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Two hours.*

Dr. DUERDEN :—

Embryology of Vertebrates.

The course deals chiefly with the development of the organs. Much attention is given to methods of studying serial sections, and to the preparation of anatomical descriptions and drawings from such sections. The lectures treat of vertebrate development from the comparative standpoint. Laboratory work, on the chick, with much supplementary demonstration.

This course may be elected as *four hours* (two lectures and two laboratory periods), or as *six hours* (three lectures and three laboratory periods).—*Second semester.*

The Anthozoa.

A special course of four lectures with laboratory work. May be taken only by special permission.—*One hour, second semester.*

Mr. Charles C. ADAMS :—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology. The lectures and conferences outline the general principles.

The field trips are devoted to the study of the animals, the conditions under which they live; methods of observation, taking notes and collecting; special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and to amphibians and reptiles among vertebrates. One class meeting and two afternoons laboratory or field work each week.—*Three hours, second semester.*

Mr. NEWMAN:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals,—those features of the life process that are common to organisms. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures per week and two half days of laboratory work.

Some acquaintance with physical chemistry will be found valuable for those who intend to pay especial attention to the physiological side of biological science; for any extensive progress in this direction such acquaintance is indispensable,

Students who have had one year's work in Biology (Botany or Zoology) are permitted to take this course. It may appropriately be taken in the second semester of the same year in which Invertebrate Zoology (Course 4) is taken.—*Four hours per week.*

Statistical Zoology.

The course deals with the methods and important results of the statistical study of variation. Especial attention is paid to the methods used in this work, the aim being to give the student a knowledge of the manner in which biological statistics are collected and treated. To this end exercises in handling statistics gathered from various sources will be assigned. The significance of the results which have been obtained by the use of the statistical method, with reference to current theories of heredity, etc., will be discussed.

Individual laboratory work to accompany the lectures may be arranged. Each student will be assigned a definite, small problem for investigation. In the assignment of these problems special attention will be paid to types found abundantly in the local fauna.—*Hours and credit to be arranged, throughout the year.*

Heredity.

This course gives an exposition and critical discussion of the results of recent investigations in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that the course in Organic Evolution be taken concurrently. This course should be of value to students specializing in sociology, psychology, and medicine, as well as to those following strictly zoological lines.—*Two hours, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or Physiology. Laboratory work, lectures, and quizzes.—*Four hours per week, second semester.*

Vertebrate Comparative Anatomy.

This course is supplementary to mammalian anatomy and may be taken only in connection with it or subsequent to it. It consists of *one lecture, and one laboratory period*. The laboratory exercises, chiefly demonstrations, are on other forms than the cat. The lectures deal with comparative anatomy.

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.

Dr. HOLMES :—

Investigations in
The behavior of animals.

Dr. DUERDEN :—

Investigations in
The anatomy, taxonomy, and physiology of the Anthozoa.

The ZOOLOGICAL FACULTY :—**Journal Club.**

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—*One hour a week, throughout the year.*

The BIRD CLUB :—

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

BOTANY.

The work in botany in this University is divisible into morphology, physiology, and ecology. For the study of these branches there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. A plant garden on the campus, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to the preparation and the needs of the candidate. In any case the candidate receives special super-

vision and direction from the instructor. For the doctorate, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found elsewhere in this Announcement.

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below.

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours' laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five credit hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more credit hours a week, throughout the year.*

Teachers' Course.

Conference and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations.—*One credit hour a week, second semester.*

Dr. POLLOCK:—

Morphology and Classification of Fungi.

Three credit hours a week, first semester.

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three credit hours a week, second semester.*

Dr. BURNS:—

Biological Relations of Plants.

Lectures, with reviews of recent literature of ecology and distribution, accompanied by field studies of habits and adaptations, and laboratory work on ecological anatomy. *Two credit hours, first semester.* By permission, students who are prepared to take up special problems may elect this course as *three or more hours.*

Variation under Natural and Artificial Conditions.

Plant breeding. Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two credit hours a week, first semester.*

Ecology.

A study of the habits and adaptation of plants. The floras of hills and valleys, of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more credit hours a week, second semester.*

Botanical Survey of the Huron Valley.

A limited number of students will be given opportunity to take part in a systematic study of the local flora.—*Two or more credit hours, second semester.*

The BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

B. PRIMARILY FOR GRADUATES.

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Dr. POLLOCK:—

Investigation in the Morphology and Physiology of Fungi and in Plant Pathology.

Dr. BURNS:—

Investigation in Ecology and Experimental Morphology.

Problems in field and laboratory work.

FORESTRY.

Assistant Professor MULFORD:—

1. Silviculture.

This course is given as follows:

(1a) Silviculture. Introductory, including the study of soil, climate and other conditions.—*Three hours, first semester.*

(1b) Silviculture. Method of artificial and natural reproduction; seedbed and nursery work; planting and sowing in forest; reforestation of denuded lands, prairies, dunes, etc.—*Three hours, second semester.*

(1c) Silviculture. Care of forests; cleaning and thinning; protection of forests against insects and other enemies.—*Three hours, first semester.*

Courses 1a, 1b, and 1c should be taken in the order here given.

Assistant Professor MULFORD:—

2. Forest Mensuration and Description.

Lectures, laboratory work, and field work.—*Three hours, throughout the year.*

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurements of the rate of growth of trees and stands; methods and manner of describing a tract of forest; forest survey.

Open only to students of forestry in first year.

Professor ROTH:—

3. Forest Utilization.

Use of timber; points of production and market; method of lumbering, milling, and marketing; minor forest industries. Lectures.—*Four hours, second semester.*

Open only to forestry students in their second year.

4. Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved

in judging the value of the forests and forest operations. Lectures and field work.—*Five hours, throughout the year.*

Open only to forestry students in their second year.

Assistant Professor MULFORD:—

5. Dendrology.

Monographic study of forest trees; their life history, distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory work and field work.—*Three hours, second semester.*

Open only to forestry students in first year.

ANATOMY AND HISTOLOGY.

Professors McMURRICH and HUBER:—

1. Anatomy of the Central Nervous System.

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have taken anatomy Course 4 or an equivalent.—*Three hours, first or second semester.*

2. Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in histology.—*Hours to be arranged with the instructor, throughout the year.*

3. Anatomical Research.

4. Histological Research.

These courses are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY.

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a *minor for the master's degree* is five hours of lectures the first semester, three hours the second semester, a laboratory course of five afternoons a week for eight weeks, the second semester, and a report on the literature of some limited subject. No research work will be required, except from those who have already taken advanced work in physiology. The requirements

for a *major for the master's degree* includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirements for a *minor for a doctor's degree* involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a *major for the doctor's degree* is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, biology, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; three hours a week, second semester.

Laboratory Course.

Ten hours a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

Catalogue of Students, 1904-1905*

NAME	RESIDENCE
Henry Herbert Armstrong, A.B., 1901, A.M., 1902, <i>Holder of a Classical Fellowship</i> Latin; Greek; Roman Law	<i>Ann Arbor</i>
Cornelius K. Baarman, A.B., <i>Hope College</i> , 1903, A.B. 1904	<i>Zeeland</i>
Carrie Augusta Barden, B.S., <i>Upper Iowa Uni-</i> <i>versity</i> , 1895 English Literature; Rhetoric; Aesthetics	<i>Corvallis, Ore.</i>
Helen Louise Bishop, A.B., <i>Vassar College</i> , 1897, A.M., 1904 Latin; Greek; Rhetoric	<i>Detroit</i>
Georgiana Cleis Blunt, Ph.B., 1896, Ph.M., 1897 Aesthetics; Metaphysics; Rhetoric	<i>Ann Arbor</i>
Wesley Bradfield, A.B., <i>Alma College</i> , 1902 Botany; Forestry; Physiological Botany	<i>Decatur</i>
George W. Brail, A.B., <i>Albion College</i> , 1902 European History; American History; Political Economy	<i>Concord</i>
Charles J. Bready, A.B., <i>Hillsdale College</i> , 1900, A.B., <i>Hope College</i> , 1902 History; History of Philosophy; English Literature	<i>Hillsdale</i>
Agnes Ewing Brown, B.S., <i>University of South</i> <i>Dakota</i> , 1900 Rhetoric; Aesthetics; Ethics	<i>South Bend, Ind.</i>
Orma Fitch Butler, A.B., 1897, A.M., 1901. Latin; Roman Law; Greek	<i>Ann Arbor</i>
James Allen Canby, A.B., <i>Bethany College</i> , 1896 Ethics; History of Philosophy; Sociology	<i>Ann Arbor</i>
Frances Elizabeth Clarke, B.L., 1900 Rhetoric; Anglo-Saxon; Aesthetics	<i>Albion, N. Y.</i>
Arthur Brooks Clawson, A.B., 1904 Zoology; Embryology; Statistical Zoology	<i>Dartford, Wis.</i>
Charles Robert Cobb, A.B., <i>Greenville College</i> , 1903 Sociology; Political Economy; Pedagogy	<i>Hastings</i>
Walter Francis Colby, A.B., 1901	<i>Hart</i>

*The principal subjects of study pursued by candidates for an advanced degree are indicated under their respective names; the subject first named being the major study.

- Lee Holt Cone, B.S., *Pomona College*, 1901 *Santa Ana, Cal.*
Organic Chemistry; Physical Chemistry; Physics
- John Leonard Conger, A.B., 1904, *Holder of the*
Peter White Fellowship in American His-
tory *Hillsdale, Ia.*
American History; European History; Political Philosophy
- Charles Wilford Cook, A.B., 1904 *Fenton*
- Alfred Dachnowski, A.B., *Taylor College*, 1897,
A.M., *ibid.*, 1900, *Holder of the Angeline*
Bradford Whittier Fellowship in Botany *Ann Arbor*
Botany; Physical Chemistry; Philosophy
- Hagopos Toros Daghistan, A.B., 1903 *Boston, Mass.*
- Frederic Warren Darling, A.B., *Cornell Univer-*
sity, 1902 *Buffalo, N. Y.*
Forest Management; Silviculture; Forest Utilization
- Charles Albert Davis, A.B., *Bowdoin College*,
1886, A.M., *ibid.*, 1889 *Ann Arbor*
Botany; Geology; Ecology
- Jean Dawson, A.B., 1902, A.M., 1903 *Caro*
Zoology; Animal Ecology; Plant Ecology
- Mary Ellen Duffy, Ph.B., 1894 *Ann Arbor*
English Literature; Rhetoric; Aesthetics
- Lionel Herman Duschak, A.B., 1904 *Buffalo, N. Y.*
- Robert Byrns English, A.B., *University of Roch-*
ester, 1896, A.M., *ibid.*, 1898, *Holder of the*
Buhl Classical Fellowship *Buffalo, N. Y.*
Latin; Greek; Ancient Philosophy
- Charles Henry Estrich, A.B., *Ohio Wesleyan*
University, 1900 *Edon, O.*
American History; European History; Political Institutions
- Earl Hazeltine Frothingham, A.B., 1904 *Chicago, Ill.*
Forest Management; Silviculture; Forest Mensuration
- Adelaide Gemberling, A.B., 1902 *Ann Arbor*
Physical Chemistry; Physics; Mathematics
- Maudelle Margaret Germonde, B.L., *Ohio Wes-*
leyan University, 1899 *Delaware, O.*
English Literature; Rhetoric; Aesthetics
- Carrie May Gilpin, A.B., *Albion College*, 1904 *Stanton*
English Literature; European History; Rhetoric
- James Floyd Halliday, A.B., 1904 *Hudson*
American History; European History; Sociology
- William D. Henderson, A.B., 1903, A.M., 1904 *Ann Arbor*
Electro-chemistry; Physical Chemistry; Physics
- Rufus Percival Hibbard, A.B., *Williams College*,
1899, *Holder of the Dexter M. Ferry Botan-*
ical Fellowship *Gloucester, Mass.*
Botany; Morphology of Algae; Zoology
- George Oswin Higley, A.B., 1891, M.S., 1893 *Ann Arbor*
General Chemistry; Physiology; Physiological Chemistry

- Cary LeRoy Hill, A.B., 1901 *Chelsea*
Forest Management; Silviculture; Timber Physics
- Flora Elsie Hill, B.L., 1899 *Marquette*
English Philology; Rhetoric; Aesthetics
- Walter Fred Hunt, A.B., 1904 *Glendale, O.*
Analytical Chemistry; Mineralogy; Commerce and Industry
- Genevieve Imus, A.B., 1903 *Ann Arbor*
Organic Chemistry; Physical Chemistry; English
- Clara Octavia Jamieson, A.B., 1901 *Ann Arbor*
Botany; Zoology; Pedagogy
- Calvin Henry Kauffman, A.B., *Harvard University*, 1896 *Ithaca, N. Y.*
Plant Physiology; Mycology; Organic Chemistry
- Allen Marshall Kline, A.B., 1904 *Elsie*
European History; American History; Political Science
- William Jacob Lehman, A.B., 1901, LL.B., 1904 *Adrian*
Political Economy; Finance; American History
- William Henry Lightstone, Jr., A.B., *Miami University*, 1903, *Holder of the Parke, Davis & Co. Fellowship in Chemistry* *Arkansas City, Kan.*
- Mary Joy Lombard, B.L., *Northwestern University*, 1901 *Ypsilanti*
German Literature; German Philology; French Literature
- Almira F. Lovell, A.B., 1884 *Ann Arbor*
- Herman William March, A.B., 1904 *Ocheyedan, Ia.*
Mathematics; Mechanics; Physics
- Frank Burr Marsh, A.B., 1902 *Big Rapids*
European History; Political Institutions; Sociology
- Vernon Griffith Mays, Ph.B., *Albion College*, 1894 *Albion*
Pedagogy; Psychology; Sociology
- John Edward Mealley, B.S., *Albion College*, 1894 *Plymouth*
American History; European History; Political Science
- Frank John Mellencamp, A.B., 1903 *Ypsilanti*
Physics; Mathematics; Analytical Chemistry
- Frank Benjamin Moody, A.B., *Bates College*, 1902 *Portland, Me.*
Forest Management; Silviculture; Timber Physics
- Lyman Foote Morehouse, B.S. (E.E.), 1897, A.M., 1904 *Ann Arbor*
Physics; Mathematics; General Chemistry
- William Daniel Moriarty, A.B., 1904 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Marion Judith Moulton, A.B., *Mt. Holyoke College*, 1904 *Hartford, Conn.*
General Chemistry; Zoology; Pedagogy
- Frances Elisabeth Nichols, A.B., *Middlebury College*, 1900 *Sudbury, Vt.*
English Literature; Philology; Rhetoric

- Mabel Edith Holmes Parsons, A.B., 1904 *Ann Arbor*
Rhetoric; Aesthetics; Sociology
- Carl Safford Patton, A.B., *Oberlin College*, 1888 *Ann Arbor*
Hebrew; Hellenistic Greek; Philosophy
- Allen Steele Peck, Ph.B., *Union University*,
1903 *Batavia, N. Y.*
Forest Management; Silviculture; Forest Mensuration
- Clyde Edwin Pickett, A.B., *Hiram College*, 1901 *Ann Arbor*
Ethics; History of Philosophy; Sociology
- Arthur McBride Ransom, B.S., 1898, *Alabama*
Polytechnic Institute, M.S., *ibid*, 1899 *Newnan, Ga.*
Analytical Chemistry; Organic Chemistry; Mineralogy
- Henry Jasper Richmond, A.B., 1902 *Pontiac*
Latin; Greek Archæology; Pedagogy
- William Rinck, A.B., *Hope College*, 1900, A.B.,
1901, A.M., 1903 *Holland*
- James Marion Robb, A.B., *Greenville College*,
1899 *Evansville, Wis.*
Mathematics; Physics
- Alexander Grant Ruthven, B.S., *Morningside*
College, 1903 *Ruthven, Ia.*
Zoology; Physiology; Physiography
- Edward Hildreth Ryder, A.B., 1903, A.M., 1904 *Ann Arbor*
American History; European History; Political Economy
- Hideo Sakuma, *Doshisha College* *Tango, Japan*
Finance; Political Economy; Municipal Administration
- John William Scholl, A.B., 1901, A.M., 1902 *Ann Arbor*
German Literature; Germanic Philology; General Linguistics
- Roda Selleck, A.B., 1898 *Ann Arbor*
Latin; Greek; Classical Archæology
- John Frederick Shepard, B.S., *Saint Lawrence*
University, 1901 *White Hall, Ill.*
Psychology; Neurology; Philosophy
- Elisabeth Ethel Sinclair, A.B., 1904, *Holder of*
the Newberry Classical Fellowship *Port Huron*
Greek; Latin; Classical Archæology
- Durand William Springer, B.S., *Albion College*,
1886 *Ann Arbor*
Municipal Administration; Commercial Law; Political Economy
- Carrie Lucile Stone, A.B., 1902 *Ann Arbor*
Latin; Classical Archæology; English Literature
- Ralph Howard Struble, A.B., 1904 *Ypsilanti*
Physics; Analytical Chemistry; Mathematics
- Ninosuke Tanaka, *Peers College* *Tokyo, Japan*
Political Economy; International Law; Finance
- Richard Ryan Thompson, A.B., *South Western*
Baptist University, 1899 *Martin, Tenn.*
French; Italian; Aesthetics
- Fred Alfred Tiedgen, A.B., *Olivet College*, 1900 *Dimondale*
Latin; Greek; Ancient Philosophy

- Orrin Edward Tiffany, A.B., 1895, A.M., 1896 *Greenville, Ill.*
American History; Political Economy; Commerce and Industry
- Ole Tønning, A.B., *Luther College*, 1904 *Decorah, Ia.*
German Literature; Germanic Philology; European History
- William John Trachsel, Ph.B., *Buchtel College*,
1902 *Canton, O.*
- Ora Travis, A.B., 1904 *Ann Arbor*
Latin; Roman Political Institutions; Ancient Philosophy
- Victor Clarence Vaughan, Jr., A.B., 1900, M.D.,
1902 *Ann Arbor*
Hygiene; Bacteriology; Physiology
- Charles Bruce Vibbert, A.B., 1904 *Detroit*
History of Modern Philosophy; Philosophy of Religion; Hebrew
- Lucia Isabelle Voorhees, A.B., 1902 *Ann Arbor*
American History; European History; American Literature
- Bess May Vrooman, A.B., 1904, *Holder of the*
Elizabeth A. Rathbone Scholarship in Amer-
ican History *Dowagiac*
American History; American Literature; European History
- Guy Leslie Wait, A.B., 1904 *Friendship, N. Y.*
Latin; Greek; Ancient Philosophy
- Joseph DeWitt Warner, A.B., *Cornell University*,
1903 *New York, N. Y.*
Forest Management; Forest Mensuration; Silviculture
- Anson Harvey Washburn, A.B., *Butler College*,
1898 *Petoskey*
Latin; American History; Pedagogy
- Hobart Hurd Willard, A.B., 1903 *Chicago, Ill.*
Physical Chemistry; Organic Chemistry; Physics
- John G. Winter, A.B., *Hope College*, 1901, A.M.,
1904, *Holder of a Classical Fellowship* *Holland*
Latin; Greek; Ancient Philosophy
- Loura Bayne Woodruff, A.B., 1895, A.M., 1898,
Holder of the Buhl Classical Fellowship *Ann Arbor*
Latin; Greek Archaeology; Ancient Philosophy
- Edmund John Zavitz, A.B., *McMaster University*.
1903 *Guelph, Ont.*
Forest Management; Silviculture; Forest Mensuration

The following students, enrolled in the Department of Medicine and Surgery, are also candidates for an advanced degree in the Department of Literature, Science, and the Arts:

- David J. Levy, A.B., 1902 *Kalamazoo*
Bacteriology; Physiological Chemistry; Hygiene
- Harry Norton Torrey, B.S., *Knox College*, 1900,
Holder of the Rockefeller Fellowship in
Bacteriology *Creston, Ia.*
Bacteriology; Hygiene; Physiological Chemistry

Candidates for a Master's Degree Studying in Absentia

- †Fabian Bouton Dodds, A.B. 1905.
Ethics; American History; Geology
- †Maude E. Ferguson, A.B. 1905.
Mathematics; German; Astronomy
- †Florence J. Freeman, A.B. 1905.
Latin; German Literature; American History
- †Clara Adele Goheen, A.B. 1905.
English Literature; Rhetoric; Sociology
- †William R. Goodrich, A.B. 1905.
German; French; Aesthetics
- †Minnie Maude Manley, A.B. 1905.
German Literature; German Philology; Rhetoric
- †Adrian Nagelvoort, A.B. 1905.
Analytical Chemistry; Mineralogy; Commerce and Industry
- †Mahlon Ellsworth Olsen, A.B. 1905.
Rhetoric; Aesthetics; English Literature
- †Anna Caroline Reding, A.B. 1905.
German; Latin; French
- †Charles Stowell Smith, A.B. 1905.
Forest Management; Silviculture; Ecology
- †Blanch Weston, A.B. 1905.
English Literature; Rhetoric; English History
- †Frank Elmer Wood, A.B. 1905.
Vertebrate Zoology; Organic Evolution; Ichthyology
-

A dagger (†) indicates that the student was admitted to the Graduate School at the beginning of the second semester, on completion of the requirements for the bachelor's degree, though the degree was not to be conferred until the end of the year.

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Memorial

UNIVERSITY BULLETIN

NEW SERIES, VOL. VII, NO. 8. MARCH. 1906

UNIVERSITY OF MICHIGAN

DEPARTMENT OF
LITERATURE, SCIENCE, AND THE ARTS

GRADUATE SCHOOL

Annual Announcement

FOR

1906-1907



Ann Arbor

PUBLISHED BY THE UNIVERSITY

1906

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE
AND THE ARTS

Graduate School

ANNUAL ANNOUNCEMENT

FOR

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1906

CALENDAR

1906.

- Sept. 25. FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY.
- Nov. — Thanksgiving Recess of four days, beginning Tuesday evening, in all Departments of the University.
- Dec. 21. (Evening) Holiday Vacation begins in all Departments.

1907.

- Jan. 8. Exercises resumed.
- Feb. 8. (Evening) FIRST SEMESTER CLOSES.
- Feb. 11. SECOND SEMESTER BEGINS.
- April 12. (Evening) Recess begins, ending April 23 (evening).
- June 20. COMMENCEMENT IN ALL DEPARTMENTS OF THE UNIVERSITY.

ADMINISTRATIVE COUNCIL

JAMES B. ANGELL, LL. D., *President.*

MARTIN L. D'OOGHE, PH.D., LL.D., *Professor of the Greek Language and Literature.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory.*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory.*

HENRY C. ADAMS, LL.D., *Professor of Political Economy and Finance.*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts.*

ALBERT A. STANLEY, A.M., *Professor of Music.*

FRANCIS W. KELSEY, PH.D., *Professor of the Latin Language and Literature.*

OTIS C. JOHNSON, PH.C., A.M., *Professor of Applied Chemistry.*

ANDREW C. McLAUGHLIN, A.M., LL.B., *Professor of American History.*

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WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology.*

JACOB REIGHARD, PH.B., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum.*

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory.*

JAMES A. CRAIG, PH.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek.*

J. PLAYFAIR McMURRICH, PH.D., *Professor of Anatomy.*

ROBERT M. WENLEY, Sc.D., LL.D., *Professor of Philosophy.*

ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages.*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching.*

*FRED N. SCOTT, PH.D., *Professor of Rhetoric.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

FREDERICK G. NOVY, Sc.D., M.D., *Professor of Bacteriology.*

EDWARD D. CAMPBELL, B.S., *Director of the Chemical Laboratory, and Professor of Chemical Engineering and Analytical Chemistry.*

ALLEN S. WHITNEY, A.B., *Professor of Education.*

FILIBERT ROTH, B.S., *Professor of Forestry.*

G. CARL HUBER, M.D., *Professor of Histology and Embryology.*

FRED M. TAYLOR, PH.D., *Professor of Political Economy and Finance.*

ALEXANDER ZIWET, C.E., *Professor of Mathematics.*

MOSES GOMBERG, Sc.D., *Professor of Organic Chemistry.*

GEORGE W. PATTERSON, JR., PH.D., *Professor of Electrical Engineering.*

FREDERICK C. NEWCOMBE, PH.D., *Professor of Botany.*

JOHN O. REED, PH.D., *Professor of Physics, and Dean of the Summer Session.*

WILLIAM J. HUSSEY, B.S., *Professor of Astronomy.*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy.*

JOSEPH H. DRAKE, PH.D., LL.B., *Junior Professor of Latin and Roman Law.*

MORITZ LEVI, A.B., *Junior Professor of French.*

WALTER DENNISON, PH.D., *Junior Professor of Latin.*

EARL W. DOW, A.B., *Junior Professor of History.*

JOSEPH L. MARKLEY, PH.D., *Junior Professor of Mathematics.*

CHARLES H. COOLEY, PH.D., *Junior Professor of Sociology.*

GEORGE REBEC, PH.D., *Junior Professor of Philosophy.*

EDWARD D. JONES, PH.D., *Junior Professor of Commerce and Industry.*

JULIUS O. SCHLOTTERBECK, PH.D., PH.C., *Junior Professor of Pharmacognosy and Botany.*

S. LAWRENCE BIGELOW, PH.D., *Junior Professor of General and Physical Chemistry.*

WALTER B. PILLSBURY, PH.D., *Junior Professor of Philosophy.*

EDWARD H. KRAUS, PH.D., *Assistant Professor of Mineralogy.*

Members of the Advisory Committee, Professors DENNISON, HUDSON, REED and LLOYD.

Secretary of the Administrative Council, Professor WALTER DENNISON.

*Absent on leave, 1906-1907.

ANNOUNCEMENT OF THE GRADUATE SCHOOL.

GENERAL STATEMENT

The University of Michigan.

The University of Michigan is a part of the public educational system of the State. The governing body of the institution is a Board of Regents, elected by popular vote for terms of eight years, as provided in the Constitution of the State. In accordance with the law of the State, the University aims to complete and crown the work that is begun in the public schools, by furnishing ample facilities for liberal education in literature, science, and the arts, and for thorough professional study of engineering, medicine, law, pharmacy, and dentistry. Through the aid that has been received from the United States and from the State, it is enabled to offer its privileges, with only moderate charges, to all persons of either sex, who are qualified for admission. In the several faculties there were in 1905-1906, 305 officers of instruction. Including the enrollment of the Summer Session, about 4,500 students, representing 52 States and Territories and 13 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts.

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1905-1906, 134 regular teachers and 28 assistants. The students in attendance numbered about 1,600, of whom about 140 were graduates. The presence of such a number of graduate students, taken with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Graduate School.

The first graduate student at the University is recorded in the catalogue of 1856. The degrees of Master of Arts and of Master of Science were earliest conferred, the degree of Doctor of Philosophy

being offered for the first time in 1875. Changes made in studies in 1877-1878 had an important bearing on graduate work at the University. This was due to the multiplication of electives and the introduction of the credit system. The seminary method of instruction began then to assume considerable proportions, and the movement was helped along by a growing demand for better trained teachers.

In the spring of 1892 the Graduate School was organized in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department, and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of higher work, and, so far as possible, for the separate instruction of graduate students. It lays emphasis, therefore, upon university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council which consists of the President of the University, the professors and junior professors in the Faculty of the department, and such other instructors as may be elected to membership. Applications for admission to the School are made to a Secretary, who is assisted by an Advisory Committee.

ADMISSION AND REGISTRATION

Admission.

The privileges of the Graduate School are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School. But admission to study in the School does not necessarily imply admission to candidacy for a degree. The requirements made of candidates for higher degrees may be found on page 8.

Graduates of other institutions whose course of study is not substantially equivalent to that prescribed at this University are required to do an additional amount of undergraduate work before being admitted to registration as members of the Graduate School.

For information in regard to enrollment for graduate study in the Summer Session, see page 12.

Registration.

All applicants for admission to the Graduate School must first present themselves with their credentials to the Secretary of the Administrative Council. In case the Secretary regards their application with favor, they will receive special blanks to be filled out

subject to the approval of the instructors under whom they wish to work, *and to be returned to the Secretary not later than two weeks after the opening of the semester.* All applications for admission to the Graduate School are subject finally to the action of the Administrative Council.

At the same time graduate students must report to the Dean of the Department of Literature, Science, and the Arts; and in common with all other students they must register in the office of the Secretary of the University, and pay their fees to the Treasurer.

All students of the Graduate School, *whether registered in a previous year or not*, are required to register with the Secretary of the Administrative Council at the beginning of *each year* of residence. *Such registration must be made at the beginning of the year to ensure recognition of meeting the residence requirement.*

Students who withdraw from the University during the academic year are requested to inform the Secretary without delay of such withdrawal.

Students who finish the undergraduate course of this University at the end of the first semester and who continue their residence for the remainder of the year, are permitted to register in the School and thus secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

Applicants who do not wish to become candidates for a degree, may be admitted and registered as special graduate students. Such graduate students must designate, and have approved, the general lines of study which they wish to pursue.

Changes of subjects originally selected must be reported to the Council for approval.

DEGREES

Admission to Candidacy.

Admission to candidacy for a higher degree is granted only to Bachelors of this University or of other universities or colleges of similar standing, or to students whose preparation for graduate study is beyond all question fully equivalent to that represented by the undergraduate course of this University. Recognition of candidacy requires the approval of the Administrative Council.

Graduate study for a degree will naturally be along lines in which the candidate has had special preparation.

Except as stated below (page 9) one year of residence study is required of all candidates for a degree. Registration should be made and subjects of study announced as early as possible, and *this must be done immediately* at the opening of the academic year in order to ensure meeting the residence requirement.

University System.

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a master's degree. It may be added also that for the master's degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within two weeks after the opening of the semester*, the particular branches of study to which they wish to give special attention. The supervision of their work will then be entrusted to the proper committee.

Degrees Conferred.

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees—M.A., M.S.

A candidate who has been admitted to study for the master's degree, may be recommended for the degree after one year of resident study at this University, provided he passes a satisfactory examination on the subjects of study approved by the Administrative Council. A thesis may or may not be included in the requirements for the degree as the committee in charge of the student's work may determine.

The work done in residence is mainly in pursuing courses of study regularly announced, but private work is often undertaken under special direction. It is expected that one minor study be in a different department from that in which the major study is taken. The subjects of study chosen should, however, be well related.

The practice of allowing students to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate of this University who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.* Candidates for the master's degree who find it necessary thus to complete a portion of their work *in absentia* are required to petition the Administrative Council through the Secretary for such privilege, and if their petition is granted, they must keep the Secretary constantly informed of their continued connection with the School and of the progress of their work.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The Doctors' Degrees—Ph.D., Sc.D.

The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. This rule may be waived in the case of those who come properly accredited from a graduate school of some other university, and of those, who as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.

It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study. The candidate must also evince ability to carry on independent research. No definite term of required residence can, therefore, be specified. As a rule, three years of graduate study are necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work. Candidates who already hold the master's degree usually find it possible to prepare for the doctor's examination after two years of further study along the same lines of work pursued for the master's degree.

A student wishing to become an applicant for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

No student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research.

A candidate for a doctor's degree must choose a major study that is substantially co-extensive with some one department of instruction in the University. He must also choose two minor studies, one of which may be in the same department as the major, but which involves a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council. A portion of the work for a doctor's degree consists in pursuing regularly announced courses of instruction, but in general a large amount of time is devoted to individual study and research under the immediate supervision of the committee in charge. This is especially true in the preparation of the thesis.

The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may at their option receive the degree of Doctor of Science.

THE THESIS.—The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but its acceptance depends more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

The thesis must be completed and a good legible copy must be put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of his thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. He is also required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee. To guarantee the printing of the thesis, every candidate for the doctor's degree is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. In case the thesis is not immediately printed, a type-written copy must be placed in the University library. In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended.

Examinations.

The final examinations of candidates for the higher degrees are commonly held during the first two weeks in June, but the examination can usually be arranged at any time when a candidate has fulfilled all the technical requirements and has satisfied his instructors that his work has been such as to warrant an examination.

Ordinarily the examinations are oral, and in each case they are held before those comprising the special committee in charge of the candidate's work and before such others as may be present by invitation of this committee. They may be preceded by such written tests as individual instructors consider necessary.

Candidates in attendance upon regular courses in which stated examinations are held, whether during the semester or at its end, are expected to take these examinations with the classes concerned, unless definitely excused from so doing.

For the requirement concerning theses, see pages 10 and 11.

PROFESSIONAL SCHOOLS

Students who are engaged in graduate work in the Department of Literature, Science, and the Arts, may be permitted to do partial work in one of the professional schools, but such permission is granted only by special action of the Administrative Council, and the time of preparation for examination for the literary degree is thereby extended.

SUMMER SESSION

Graduate students, who are regularly matriculated in the University, may carry on work during the Summer Session which will count toward an advanced degree. Graduates of other universities or colleges of similar standing, who are competent to enroll for a higher degree, may matriculate in the University and begin graduate study during the Summer Session. For the matriculation fee, see below, page 13.

Candidates for the master's degree, if graduates of the University of Michigan, may present themselves for examination after attendance upon three Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Graduates of other institutions, who have been admitted to candidacy for a master's degree, may present themselves for examination after attendance upon three Summer Sessions and one semester's residence in the University.

Many teachers avail themselves of this opportunity to begin graduate work, and later return to the University to complete the requirements for a higher degree. The number of courses in the Summer Session designed especially for graduates is large and constantly increasing. In many respects the advantages afforded for advanced study are distinctly superior to those enjoyed during the academic year. These advantages are found in the smaller classes, in the freer use of the facilities of libraries, laboratories and museums, but especially in that more direct, intimate and personal contact with the professor in charge which adds so greatly to the satisfaction and efficiency of specialized work.

In addition to the courses regularly announced for graduate instruction, it should be noted that all professors giving work during the Summer Session will gladly arrange and direct the work of graduate students competent to enroll for a degree, who may desire to work along special lines for which specific courses have not been provided.

FEES AND EXPENSES

Matriculation Fee.—Every student before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or students shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Fee for Summer Session.—The tuition fee for the Summer Session of the Department of Literature, Science, and the Arts, for graduate students who have already matriculated, is fifteen dollars regardless of the number of courses taken.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for materials and apparatus actually consumed by them. The laboratory expenses thus depend upon the student's prudence and economy. Experience has shown that in the chemical laboratory the average expense for all courses is about one dollar and twenty cents a week. The deposits required in advance vary with the courses taken, ranging from one to twenty dollars.

Diploma Fee.—The fee for the diploma given on graduation is ten dollars, and a by-law of the Board of Regents prescribes that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Holders of fellowships and of scholarships are required to pay the matriculation fee (if not already paid), the annual fees, the diploma fee, laboratory expenses, and other similar charges, the same as other students of the department in which their work lies.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

THE LIBRARIES

The libraries of the University, comprising the General Library, the Medical Library, the Law Library, the Homœopathic Library, and the Dental Library, contained in the aggregate, June 30, 1905, 194,672 volumes and 4,559 pamphlets. One thousand one hundred and forty-eight periodicals are regularly received.

THE GENERAL LIBRARY contains 154,435 volumes, 3,800 pamphlets, and 3,050 maps. It includes the following special collections: Parsons Library (political economy), 6,076 volumes; McMillan Shakespeare Library, 5,803 volumes; Goethe Library, 1,077 volumes. The Hagerman Collection and the Dorsch Library, formerly treated as special collections, have, with the approval of the donors, been merged in the general collection. Eight hundred and twenty-two periodicals are taken by the General Library.

Within the last few years the library has been enriched by several valuable gifts. Among the more important of these that deserve special mention are the historical books, including the Stevens Facsimiles, presented by Mr. Clarence M. Burton, of Detroit; the Morris Philosophical Library, presented by Mrs. George S. Morris; the Alpheus Felch Historical Library, bequeathed by the late Governor Alpheus Felch; the Walter Library of Romance Literature, bequeathed by the late Professor Edward L. Walter; the Stearns Musical Collection, presented by Messrs. Frederick and Frederick K. Stearns, of Detroit; and, subject to certain conditions as to its use, the Germanic Library of the late Professor George A. Hench, presented by his mother, Mrs. Rebecca A. Hench.

Officers and students of the University draw books from the library, subject to certain restrictions. Special privileges are granted to graduate students, and separate rooms provided for them where work is pursued with the necessary books at hand. The reading room for general use will seat 300 readers.

The library is open for consultation fourteen hours daily during the academic year, and nine hours daily during the Summer Session, and the summer vacation. On Sundays and important legal holidays the library is closed.

THE LAW LIBRARY, of over 20,000 volumes, is of especial value for graduate work in political science. It contains the statutes and judicial reports of every state and the United States, and an extensive collection of treatises, text books and legal periodicals, both American and English. It is housed on the second floor of the Law Building, with an ample reading room.

THE LABORATORIES

Physical Laboratory.

The Physical Laboratory has recently been greatly enlarged by the addition of a new lecture room and increased space for laboratory work. This enlargement permits the department to devote some of the smaller rooms to advanced and graduate work. Here work in

electrochemistry, sound and light, heat, and electrical measurements will be conducted in separate suites of rooms, and special provision will be made for graduate students. The apparatus for these courses is already extensive, and additions are made every year to meet the needs of advanced instruction.

Chemical Laboratory.

The Chemical Laboratory has a floor space of over fifty thousand square feet. About fifty courses are offered during the college year, most of which involve laboratory work. The building contains a reading room in which are shelved the most frequently required reference books and a few duplicate sets of chemical journals. The main portion of the Chemical Library is readily accessible in the adjacent library building, and is especially valuable to the research student because of its complete sets of forty-nine journals devoted wholly or in large degree to Chemistry.

In addition to a full supply of routine materials and apparatus for work in General, Analytical, Organic, Physical, Pharmaceutical and Technological Chemistry, facilities are offered for advanced study and research along many lines, including apparatus for the preparation of raw materials, a continuous extraction apparatus, a hydraulic press capable of exerting a pressure of five thousand pounds per square inch, a filter press and a power-driven centrifugal machine. Direct current is available at various voltages from storage batteries, rotary transformers, and a 220-volt power plant for electrochemical or electrothermal work. Advanced students have also at their disposal various types of resistance, resistor and arc furnaces, as well as oil and gas fired furnaces for high temperature work, and both electrical and optical pyrometers. Special facilities are provided for the preparation and microscopic or photomicrographic examination of specimens either in thick polished section by vertical illumination or in thin section by either plane or polarized light. Five ventilated dark rooms provide for spectroscopic, photometric, and photographic work and experiments in refraction. Sixty analytical balances are distributed in four balance rooms and in private laboratories, and others for heavier loads or of greater delicacy are reserved for special purposes.

Mineralogical Laboratory.

This laboratory occupies eight rooms in the basement of Tappan Hall and has a total area of nearly 6,000 square feet. One large room is used for general laboratory purposes, another is devoted to blow-pipe methods and chemical crystallography, while a third room contains the mineralogical collections. There are also dark rooms for goniometric measurements. The general laboratory is well equipped with crystal models, natural crystals, and working collections for the rapid determination of minerals, principally by means of the physical properties. It is also equipped with goniometers and polarization

microscopes. The blowpipe laboratory possesses ample facilities for the carrying out of blowpipe tests, both upon plaster tablets and charcoal, as well as all other chemical reactions useful in the determination of minerals. The mineralogical collections include the Lederer, Garringer, and Rominger collections.

The facilities of the laboratory are such that, aside from the general courses, special attention is given to graduate and research work along the line of crystal measurements and chemical crystallography.

Geological Laboratory.

Opportunity for work in geology is provided in rooms set apart for this use in the museum building. The rooms are furnished with microscopes, photographic instruments, cutting and polishing lathes, and other apparatus for the preparation of specimens. Special encouragement and assistance are given to students wishing to carry on original investigation. See page 78.

The Astronomical Observatory.

The University Observatory was founded through the liberality of citizens of Detroit, and on this account it is known as the Detroit Observatory. It is situated on the northeastern border of Ann Arbor, about half a mile from the Campus. Its principal instruments are a refracting telescope of twelve inches aperture and a large meridian circle, presented by the late Henry N. Walker of Detroit. It has also a six-inch equatorial telescope, a comet seeker, a zenith telescope, sidereal and mean time clocks, chronograph, theodolites, etc. The larger instruments are intended primarily for research, and will be available to that end for such students as have the technical ability to use them to advantage. A shop has been established on the grounds for the repair and construction of instruments, and alterations and additions are now in progress which will add materially to the effectiveness of the equipment, both for instruction and research. The Department possesses a large technical library, and is in receipt of the publications of the leading observatories of the world.

Zoological Laboratory.

The Zoological Laboratory of twenty rooms occupies the second and third stories of the south wing of University Hall. In addition to rooms for general class and laboratory work, there are private rooms for members of the teaching staff and for assistants and research students. Each of these rooms accommodates from one to three persons and research students may thus work free from the disturbances incident to a large laboratory. All rooms are provided with gas, electricity and running water and are fitted with special tables.

In addition to the usual apparatus (microscopes, microtomes, imbedding and reconstructing apparatus) graduate students will find an ample supply of glassware and chemicals and of the minor labora-

tory conveniences. All these are systematically arranged and catalogued and are made freely accessible, so that the research worker is saved unnecessary delay.

A photographic room and dark room are a part of the laboratory. They are equipped for all classes of scientific photography, by means of either vertical or horizontal camera, with or without the microscope. There is also apparatus for outdoor photography.

A good working library of the more important zoological journals in all languages, as well as of separate publications, is shelved in a separate room in the laboratory. In addition much zoological literature is to be found in the University Library and in the library of the Medical Department. A set of the zoological cards of the Concilium Bibliographicum since its foundation is most conveniently arranged and kept sorted up to date in the General Library.

A special effort is made to facilitate the study of living animals. For this purpose there is a small vivarium fitted with cases suitable for terrestrial and amphibious animals. There are sixteen large, glass and slate aquaria, one of them seven feet long. There are arrangements for maintaining thirty still smaller aquaria with running water for the study of developmental stages and isolated forms. For field work there is a good equipment of collecting apparatus in sets for individual use and a supply of the larger apparatus for joint use.

Botanical Laboratory.

The Botanical Laboratory is well equipped for advanced students for the study of morphology, physiology, and ecology. Means are at hand for embedding in paraffin and collodion, for microtome sectioning, and for staining. Culture media and apparatus, sterilizing ovens and cabinets, with adequate collections and literature, offer means for research with bacteria and fungi. Chemical and physiological apparatus, klinostats, centrifuges, constant temperature rooms, dark-rooms, aquaria, and plant houses afford facilities for research in physiology. The location of the University gives easy and immediate access to a varied flora of a diversified topography, including the plains of the old Lake Erie bottom, and the hills, valleys, bogs, lakes, and rivers of the terminal moraine of the glacial drift.

Forestry Laboratory.

In the Forestry Laboratory students receive instruction in forest botany, timber physics, structure of woods, and certain features of wood technology, as well as in forest measurements and the methods of study of the growth of timber. A good collection of wood specimens, sections of trees, and herbarium material is provided and will be increased as rapidly as possible. There is an ample supply of microscopes, compasses, calipers, height measures, and other apparatus for use in the laboratory and in the field.

Special facilities for the study of forestry are supplied by the Saginaw Forest Farm, a tract of land about one mile west of the

city of Ann Arbor, presented to the University by the Honorable Arthur Hill, of Saginaw.

The farm, comprising eighty acres, is to serve as an object lesson in forestry. Upon it provision is to be made for (1) an arboretum of all useful forest trees that can grow in Michigan; (2) demonstrative areas for seed-bed and nursery work; (3) model plantations of forest trees; and (4) special experiments in forestry, relating to various methods of propagating different kinds of timber, to the raising of particular forest products, and to other practical purposes.

Psychological Laboratory.

The Psychological Laboratory occupies fourteen rooms, including two dark-rooms. All are connected by wires with a central switchboard, and can be supplied with low potential currents from a central plant and connected in pairs for chronometric work. Power is provided by electric motors.

The apparatus includes all the more important standard instruments and many specially devised for researches that have been carried on in the laboratory. The equipment for work in sound and for studying the relations between the psychological processes and mental states is particularly large, but every field is represented. Among the instruments may be mentioned kymographs by Zimmermann, Hipp chromoscopes, the ton variator of Stern with the Whipple gasometer bellows, a complete set of Verdin's instruments for investigating speech, forks of König and Edelmann, and a modified Wien apparatus by Kohl for determination of sound intensities.

Special apparatus for research work will be procured, or constructed, as may be desired by individual students doing advanced work.

Statistical Laboratory.

This laboratory is equipped with various instruments to facilitate the computation and tabulation of statistics. Students are instructed in the preparation and tabulation of premiums, reserves, and other schedules required in the practical work of insurance offices and statistical bureaus. The laboratory also contains a working library comprising most of the important actuarial journals and text books on actuarial theory.

THE MUSEUMS AND OTHER COLLECTIONS

University Museum.

The University Museum contains collections illustrative of geology (the mineral collection, for convenience of instruction in mineralogy, being cared for in Tappan Hall), of zoology, and of anthropology. Special collections in botany, materia medica, chemistry, anatomy, and the industrial arts are deposited in the various buildings devoted to the subjects they illustrate. All of these are accessible to students.

The following descriptions indicate the character of some of the collections included in the University Museum.

I. THE GEOLOGICAL COLLECTION consists of:—

a. **THE MINERALOGICAL COLLECTION**, comprising about 6,000 specimens. It embraces about 2,500 specimens (principally European) purchased of the late Baron Lederer, and known as the **LEDERER COLLECTION**; and, besides others, a rich collection of the **MINERAL SPECIES OF MICHIGAN**, including all varieties of copper ore and associated minerals from the Lake Superior mining region.

b. The large series of lithological and palæontological specimens brought together by the State geological survey, of which over a hundred fossil species have become the types of original descriptions.

c. **THE WHITE COLLECTION**, consisting of 1,018 distinct entries, 6,000 specimens, of invertebrate fossils.

d. **THE ROMINGER COLLECTION**, embracing about 5,000 species of invertebrate fossils, represented by at least 25,000 specimens.

e. **SMITHSONIAN DEPOSITS**, consisting, for the present, of a collection of specimens of foreign and domestic building stones, and specimens of fossils from the Upper Missouri.

f. **MISCELLANEOUS DONATIONS, COLLECTIONS, AND PURCHASES**, including a series illustrative of the metalliferous regions of the Upper Peninsula, collected by the late Professor Alexander Winchell; an interesting collection of fossils, chiefly Cretaceous, from the Yellowstone Valley, presented by the late General Custer, U. S. A.; and a series of six to eight hundred rock species and varieties from the Drift of Ann Arbor, collected, dressed to standard size and form, and presented by the late Miss Eliza J. Patterson. A collection of 150 specimens of ores and rocks has recently been presented by the United States National Museum.

The entire collection, the larger portion of which consists of invertebrate fossils, is estimated to contain approximately 17,000 entries and about 60,000 specimens.

II. THE ZOOLOGICAL COLLECTIONS are large. They include a collection of animals of the Pacific Coast made by Lieutenant Trowbridge, and many valuable specimens collected in the Philippine Islands by Dr. Joseph B. Steere in the years 1887 and 1888.

The Bird Collection includes about 4,285 skins and 1,533 mounted specimens. The collection of Alcoholic Material includes a series of invertebrate types, as well as many interesting vertebrates and a considerable number of anatomical preparations. It is stored in a darkened room. The Mollusk Collection includes the shells of nearly 6,000 species, representing most of the genera of land, fresh-water, and marine mollusks. They are thoroughly classified and arranged according to the latest authorities, making the collection of special value to the student. The Coral Collection includes a large number of species, mostly from Formosa and the Philippines.

III. THE ANTHROPOLOGICAL COLLECTIONS. Among the most notable features of this department of the Museum are:—

a. THE ORIENTAL SECTION, including the entire Chinese Collection, which the Chinese Government sent to the New Orleans Exposition in 1885.

b. THE STEARNS COLLECTION of musical instruments, comprising over 1,400 typical instruments of all nations—ancient and modern, civilized and savage—illustrating the history of music and the progress of musical art.

c. The collection of Peruvian and New Mexican ceramics, including an exceptionally fine series of ancient Peruvian burial pottery and modern basins secured by the Beal-Steere Expedition, and an extensive series of New Mexican pottery received from the Smithsonian Institution.

d. The modern Indian section, including wearing apparel, implements of war and the chase, and household utensils of the South American, North American, and the Alaskan Indians, and a fine example of the Alaskan totemic column.

e. The Stone Age section, including the local collection of the late David De Pue, a series of Danish implements, and a series of casts of rare implements prepared by the Smithsonian Institution.

Museum of the Fine Arts and History.

The works of art belonging to the University are on exhibition in the galleries provided for them in the library building. A printed catalogue, prepared by Professor Martin L. D'Ooge, contains fuller descriptions than can here be given. The collection was begun in 1855. It contains a gallery of casts, in full size and in reduction, of some of the most valuable ancient statues and busts, such as the Apollo Belvedere, the Laocoon, and the Sophocles; casts of the sculptural decorations from the arch of Trajan at Beneventum, presented by the class of 1896; more than two hundred reductions and models in terra cotta and other materials; the statue of Nydia by Randolph Rogers; casts of modern statues, busts, etc., and reliefs; a number of engravings and photographic views, illustrating especially the architectural and sculptural remains of Ancient Italy and Greece; a small collection of engraved copies of the great masterpieces of modern painting; two series of historical medallions—the HORACE WHITE COLLECTION and the GOVERNOR BAGLEY COLLECTION—the former illustrative of ancient, mediæval, and modern European history, the latter designed to embrace the commemorative medals struck by order of Congress or other authorities, and now containing one hundred such medals; and a large collection of coins, chiefly Greek and Roman, presented to the University by the late Dr. Abraham E. Richards.

The ROGERS GALLERY comprises the entire collection of the original casts of the works of the late Randolph Rogers, more than a

hundred in number. It was given by that distinguished sculptor to the State of Michigan for the University museum.

The LEWIS GALLERY, bequeathed to the University by the late Henry C. Lewis, of Coldwater, comprises about four hundred and fifty paintings and forty pieces of statuary.

THE DE CRISCIO COLLECTION OF LATIN INSCRIPTIONS, about 250 in number, ranging in age from the reign of Augustus to the 5th century, A. D. The most of the inscriptions are on slabs of marble. This collection was acquired in 1899 through the generosity of Mr. Henry P. Glover, of Ypsilanti.

The late J. Q. Adams Fritchey, A.M., of St. Louis, Mo., a graduate in the Class of 1858, bequeathed to the University a collection of modern coins, medals, and medallions, numbering about one thousand, issued prior to 1876, and possessing historic value and interest to numismatics.

Dr. Henry Smith Jewett (A.B., 1868), of Dayton, Ohio, has recently presented to the University a complete set of the various issues of fractional currency issued by the United States government during the Civil War and Reconstruction periods. Accompanying this collection is a nearly complete set of the "documentary" stamps issued by the government during the Civil War.

Special Collections and Museums.

THE BOTANICAL COLLECTION is shelved in the Botanical Laboratory, and contains, in addition to Michigan plants collected by the public surveys, several valuable herbaria and sets of plants that have been presented to the University from time to time. Among these some of the most important are the HOUGHTON HERBARIUM, the SAGER HERBARIUM, the AMES HERBARIUM, the HARRINGTON COLLECTION, the BEAL-STEERE BOTANICAL COLLECTION, the ADAMS-JEWETT COLLECTION, and the GARRIGUES COLLECTION.

The collections in PHARMACOGNOSY and INDUSTRIAL CHEMISTRY occupy a floor space of 2,500 square feet in the chemical building. The PHARMACOGNOSY COLLECTION comprises several thousand mounted and labeled specimens of products from all parts of the world, such as are used for medicinal, alimentary, and industrial purposes. The cultivation and preparation for the market and the commerce of these articles among the peoples of the earth, are illustrated by collections of authentic photographs, many of which have been expressly procured for the study of commerce with distant parts of the world.

The collection in Industrial Chemistry illustrates the natural resources and chief manufactures of Michigan, and of various parts of the world. Crude materials, raw and unfinished products, as well as completed articles of commerce in their several grades are displayed, together with models and plans of production by modern methods.

SOCIETIES

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc. These societies are the following:

The Philological Association, the Classical Journal Club, the Romance Journal Club, Cercle Français, the Germanic Journal Club, University Oratorical Association, the Political Science Club, the Philosophical Society, the Mathematical Society, the Physical Colloquium, the Chemical Colloquium, the Zoological Journal Club, and the Botanical Journal Club.

FELLOWSHIPS

Elisha Jones Classical Fellowship.

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President Angell, and Professors D'Ooge, Kelsey, Hudson and Pattengill. The period of incumbency is limited to two academic years, and must be spent at this University unless at any time the examining board shall see fit to allow the second year to be spent at some other place favorable to classical study.

No income has been available for the current year.

Newberry Classical Fellowship.

Mrs. Helen H. Newberry, of Detroit, who gave the sum of three hundred dollars in 1904 for the maintenance of a Fellowship in the classics, continued the Fellowship for 1905-1906. The holder of the Fellowship was Elizabeth Ethel Sinclair, A.M.

Buhl Classical Fellowship.

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1905-1906. The joint holders of the Fellowship for the year were John G. Winter, A.M., and Laura Bayne Woodruff, A.M.

Peter White Classical Fellowship.

A Classical Fellowship with an income of three hundred dollars has been provided for the year 1905-1906 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was Mary Louise Smith, A.B.

Peter White Fellowship in American History.

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1905-1906 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was John Sharpless Fox, A.B.

The George S. Morris Fellowship in Philosophy.

The sum of four hundred and fifty dollars was given by Mrs. George S. Morris for the support of a Fellowship to be known as the George S. Morris Fellowship in Philosophy, in honor of George S. Morris, Professor of Modern Languages and Literature from 1870 to 1879, and of Philosophy from 1881 to 1889, and for the purchase of books for the Morris Philosophical Library. One hundred dollars were devoted to the latter purpose, and a fellowship of three hundred and fifty dollars was awarded, for the year 1905-1906, to Charles Edwin Galloway, A.B.

Mrs. Morris will make a similar gift for 1906-1907, and the amount will be divided, or not, at the discretion of the instructors in Philosophy. Applications should be sent in before May 1, and should be accompanied by the fullest credentials.

Fellowship in Chemistry.

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1905-1906 of the Fellowship in Chemistry established by them in 1895. The holder of the Fellowship for the year was Horace John Howk.

Stearns Fellowship.

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars. The holder of the Fellowship for 1905-1906 was Lewis Eugene Warren, Ph.C.

Gas Engineering Fellowship.

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of a Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for special apparatus and material required for research. The holder of the Fellowship for the year was Joel Martin Barnes, B.S.

Rockefeller Fellowship.

The Rockefeller Institute for Medical Research has continued its grant for a Fellowship in Hygiene and Bacteriology for the year 1905-1906. The holder of this Fellowship for the year was Rudolf Ernest Knapp, B.S.

Angeline Bradford Whittier Fellowship in Botany.

This Fellowship has been established by Joseph Bradford Whittier, of Saginaw, in memory of his mother. The principal sum of the endowment is four thousand dollars. The holder of this Fellowship for the year 1905-1906 was Alfred Dachnowski, A.M.

Dexter M. Ferry Fellowship in Botany.

Provision for a Fellowship in Botany, with an income of five hundred dollars, was continued for the year 1905-1906 by Mr. Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year was Rufus Percival Hibbard, A.B.

The Charles James Hunt Fellowships.

In July, 1900, Mr. Charles James Hunt, of Detroit, a graduate of the University in the class of 1846, and wife, conveyed to the Board of Regents, in trust, the title to certain pieces of real estate, subject to Mr. Hunt's life-interest in the income to be derived therefrom, and to the life-interests of other persons named in the deed. After the termination of these life-interests "one or more Fellowships in the University of Michigan" are to be established in accordance with conditions named in the deed of trust and in accompanying documents, and are to be known as the Charles James Hunt Fellowships.

University Scholarship at the Chicago Commons.

A Scholarship at the Chicago Commons, amounting to about two hundred dollars is maintained by the students of the University for purposes of sociological study, and an advanced student in that subject is sent from the University every year to live at the settlement for several months, and study some phase of sociological conditions. The appointments are made in the spring by a committee consisting of Professors Adams, Taylor and Cooley. The present holder of the Scholarship is Chester S. Carney.

TEACHERS' APPOINTMENT COMMITTEE

An appointment committee of the Faculty of the Department of Literature, Science, and the Arts, composed of representatives of the various departments of instruction, has been constituted for the purpose of assisting men and women who are studying, or have studied, under this Faculty, to secure positions as teachers. This service is performed gratuitously, in the interest of students of the University, past or present, and of superintendents of schools and boards of education wishing to employ teachers. Students who have pursued advanced work along chosen lines of study naturally receive special consideration. Persons desiring to reach this committee should address their communications to the Secretary of the Appointment Committee.

MUSICAL ADVANTAGES

Graduate students interested in music have in Ann Arbor exceptional advantages, whether they wish to hear good music for recreation and as a part of a liberal education, or to pursue special studies.

The theory of music may be studied under the direction of the Professor of Music in the University, who offers several courses; applied music may be taken in the University School of Music, which furnishes instruction of University grade in Piano, Voice, Violin and Organ.

In the course of the year there are many concerts, the prices of which are fixed at cost in order to make it possible for all students to hear them. A series of ten is given by the Choral Union, a University organization maintaining a chorus of three hundred members (chiefly students), five concerts being grouped in the May Festival, at which works of the first rank are presented with full chorus and orchestra. Another series of ten concerts is given by the Faculty of the University School of Music. A third series, consisting of historical piano recitals, is given by the head of the pianoforte department in the University School of Music. There are in addition many other concerts and recitals every season.

Students who have had an adequate preliminary training may take music as either a major or a minor in connection with other graduate studies.

The University is so fortunate as to possess the great organ which was built for the Columbian Exposition, in 1893. After the

Exposition this was brought to Ann Arbor and set up in University Hall as a memorial of Henry S. Frieze, who was Professor of Latin in the University from 1854 to 1889.

In the University Museum is the Stearns Collection of Musical Instruments, presented by Mr. Frederick Stearns, of Detroit. This collection is available for special study to students who are competent to work upon the difficult problems for the solution of which they furnish material.

COURSES OF INSTRUCTION

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates. For further information reference may be made directly to the head of the department concerned.

A more complete statement of the appointments and resources of the University will be found in the University Calendar, and fuller information regarding the courses of instruction, their times and places of meeting is given in the Annual Announcement of the Department of Literature, Science, and the Arts. In some cases special departmental announcements are issued. All these publications will be furnished without charge on application to James H. Wade, Secretary of the University.

Inquiries concerning admission to the Graduate School and its courses of study should be addressed to Professor Walter Dennison, Secretary of the Administrative Council.

GREEK.

The courses here announced presuppose, in general, four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Lysias, Xenophon, Homer, Demosthenes, the Tragic Poets, and Aristophanes.

Professor D'OUGE:—

Teachers' Course.

Lectures on Greek Grammar; particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week, first semester.*

Seminary in Tragedy.

Studies in Sophocles, with special reference to the dramatic art of the poet, his use of meters, and the antiquities of the Greek stage.—*Three hours a week, first semester.*

[The Oresteian Trilogy of Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet.—*Three hours a week, first semester.*

Omitted in 1906-1907; to be given in 1907-1908].

The History of Greek Art from the Beginning to the Roman Period.

Gardner's Handbook of Greek Sculpture and Tarbell's History of Greek Art will be made the basis of a more extended study.—*Three hours a week, first semester.*

[Modern Greek.

Practical introduction and practice in reading specimens of modern Greek literature.—*Two hours a week, first semester.*

Omitted in 1906-1907; to be given in 1907-1908]

Plato and Aristotle.

Selections from the *Gorgias* and the *Nicomachean Ethics*.—*Two hours a week, first semester.*

Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.—*Three hours a week, second semester.*

[Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week, second semester.*

Omitted in 1906-1907; to be given in 1907-1908].

Seminary in Plato's Republic.

Two hours a week, second semester.

Lucian.

Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week, second semester.*

[Aristotle's Athenian Constitution.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week, second semester.*

Omitted in 1906-1907 ; to be given in 1907-1908].

Pausanias and the Topography and Monuments of Ancient Athens.

Two hours a week, second semester.

[Lectures on Ancient Greek Life.

Illustrated by means of stereopticon.—*One hour a week, second semester.*

Omitted in 1906-1907 ; to be given in 1907-1908].

Professor ————— :—

[Herodotus. Books VII and VIII.

Three hours a week, first semester.

Omitted in 1906-1907 ; to be given in 1907-1908].

Thucydides and a Study of the Peloponnesian War.

Three hours a week, first semester.

[The Bucolic Poets. The Idyls of Theocritus, Bion, and Moschus.

Three hours a week, second semester.

Omitted in 1906-1907 ; to be given in 1907-1908].

Aristophanes: The Clouds, the Birds, and the Frogs.

Three hours a week, second semester.

Assistant Professor SANDERS :—

Greek Epigraphy.

A study of the local alphabets, and exercises in reading inscriptions.—*Two hours a week, first semester.*

Greek Palæography.

Two hours a week, second semester.

Dr. NEWCOMER.

Greek Prose Composition.

This course is intended for those who are preparing to teach Greek.—*Two hours a week, second semester.*

LATIN.

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the University collection of classical antiquities and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museums of Rome and Naples.

4. Casts of ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have lately been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 300 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmaeler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Professor KELSEY:—

Latin Seminary: Roman Satirists.

Open to graduate students only.—*Two hours a week, throughout the year.*

Juvenal and Persius.

Interpretations and lectures.—*Two hours a week, first semester.*

The Topography and Monuments of the City of Rome.

Lectures, illustrated by photographs, engravings and stereopticon slides.—*Three hours a week, second semester.*

[Roman Art, as studied in the Monuments.

General Introduction to Roman Archæology; lectures on Roman architecture, sculpture, and painting. This course will be illustrated by photographs, engravings, and stereopticon slides, with

occasional lectures upon the casts in the Art Gallery.—*Three hours a week, second semester.*

This course will be omitted in 1906-1907.]

Professors KELSEY and DENNISON:—

Cæsar's Gallic War (Teachers' Course, A).

Lectures. Papers prepared by those taking this course. Critical study of the text of the Gallic War, on the basis of Meusel's edition; studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical studies of the Bucolics, and selected portions of the Georgics, Aeneid, and Appendix Vergiliana, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DRAKE:—

Roman Literature.

Interpretations of selections from representative authors, from Ennius to Boethius; lectures.—*Four hours a week, first semester.*

General Course in Roman Literature.

Lectures and Topical Studies. This course is designed for students interested in the general subject of literature. No knowledge of Latin is required. The Roman literature will be treated in its broad relations to the Greek literature and to modern literature.—*Two hours a week, first semester.*

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given

to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparisons.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law as given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, first semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

Professor DRAKE and Assistant Professor MEADER:—

Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Professor DENNISON:—

Latin Inscriptions.

Reading of inscriptions of different periods from the De Criscio collection and from reproductions. Interpretations of selected inscriptions.—*Two hours a week, second semester.*

Martial; Petronius, Trimalchio's Banquet.

With special reference to the private and social life of the Romans.—*Two hours a week, first semester.*

[The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century.—*Two hours a week, second semester.*

This course will be omitted in 1906-1907.]

The Letters of Cicero.

Interpretation of selected letters, with special reference to Roman manners and political conditions at the end of the Republic.—*Two hours a week, second semester.*

[The Private Life of the Romans.

Lectures on Roman life and the social conditions of antiquity; illustrated by stereopticon slides.—*One hour a week, first semester.*

This course will be omitted in 1906-1907.]

Professor DENNISON, Assistant Professors SANDERS and MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

[The Sources of the Roman Historians.

Lectures with direction of work on special themes.—*One hour a week, first semester.*

This course will be omitted in 1906-1907.]

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Tibullus and Propertius.

Reading course with lectures on the Roman elegy.—*Two hours a week, second semester.*

Assistant Professors SANDERS and MEADER:—

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both

the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Assistant Professor MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

[The Pseudo-Cæsarian Bellum Africanum and Bellum Hispaniense.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1906-1907.]

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

SANSKRIT AND COMPARATIVE PHILOLOGY.

Before beginning the study of Sanskrit, the student should have pursued courses in two of the three subjects, Greek, Latin, and German for at least four semesters. The courses in Comparative Philology are open to students of modern as well as of ancient languages.

Assistant Professor MEADER:—

Beginners' Course.

Grammar and exercises in translation and composition. Text-books: Whitney's or Thumb's Grammar and Lanman's Sanskrit Reader.—*Two hours a week, first semester.*

Advanced Courses.

A. Interpretation of the selections contained in Lanman's Sanskrit Reader, with elementary studies in the comparative morphology of the more important cognate languages.—*Two hours a week, second semester.*

B. Rapid Reading of Easy Sanskrit.—*One hour a week, first semester.*

[C. Advanced Reading: Kalidasa's Cakuntala. Elements of Prakrit.—*One hour a week, second semester.*

This course is omitted in 1906-1907.]

D. Advanced Reading: Selections from the Vedas.—*One hour a week, second semester.*

Comparative Philology.

A general introduction to comparative Indo-European philology. Study of the relationships, classifications and general characteristics of the Indo-European languages, and discussion of the main questions of comparative phonology, morphology and syntax. *A knowledge of Sanskrit is not required.* Lectures and recitations. —*One hour a week, throughout the year.*

SEMITICS AND HELLENISTIC GREEK.

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of the classical and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

Professor CRAIG and Dr. FRENCH:—
Hebrew.*

1. Genesis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

2. Historical Literature: Judges and I and II Samuel.

Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

3. Prophetic Literature:

Amos, Hosea, and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

4. Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

Assyrian.

1. Introduction to Easy Historical Inscriptions

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

2. Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Three hours a week, second semester.*

3. Babylonian Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

4. Religious Literature.

King's "The Prayers of the Lifting-up of the Hand." Craig's "Religious Texts."—*Two hours a week, second semester.*

History and Archæology.

1. Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

2. Lectures on the History of Israel and Judah

From earliest times to the Reformation of Ezra.

3. Lectures. Introduction to the Study of the Old Testament.

4. Lectures. Study of the Prophetic Books of the Old Testament.

5. Lectures. The Religion of the Semites.

6. Lectures. The Wisdom Literature of the Jews and comparison with similar productions by other peoples.

Arabic.**1. Introductory Course.**

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

2. Selected Suras from the Quran.

Chrestomathia Qurani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

Aramaic, Syriac, Ethiopic.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

Hellenistic Greek.**1. New Testament.**

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

2. Septuagint.**ROMANCE LANGUAGES AND LITERATURE.****FRENCH.**

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1905-1906.

Professor CANFIELD:—**[Poetry of the Nineteenth Century.]**

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discus-

GERMANIC LANGUAGES AND LITERATURE.**GERMAN.**

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 10, and options in 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8, as described in the University Calendar for 1905-1906, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature in the second half of the Nineteenth Century.

Lectures, assigned readings and discussions.—*Two hours a week, the second semester.*

Proseminary in Modern German Literature.

The Storm and Stress Movement. Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Heinse, etc. The chief aim of this course is to acquaint the student with the methods of modern literary research. Primarily for graduates.—*Two hours a week, first semester.*

Teachers' Course.

Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

JOURNAL CLUB:—

Current Literature on Germanic Philology and Literature.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year, at which reports are made on the important contributions to Germanic philology and literature.

Assistant Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of Modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned

topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1906-1907; to be given in 1907-1908.]

Assistant Professor HILDNER:—

Hans Sachs.

Lectures and reports.—*Two hours a week, second semester.*

Dr. FLORER:—

The Early Writings of Lessing.

Lectures, investigations, and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Life and Works of Luther.

Lectures and reports. Special attention is paid to Luther's language. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Dr. BOUCKE:—

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and to give a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

GOTHIC.

Assistant Professor DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN.

Dr. BOUCKE:—

Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

PHONETICS.**The Elements of Phonetics.**

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

ENGLISH.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The Development of the English Novel; The English Satirists of the Seventeenth and

Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

Old English.*

A general introduction to the subject.—*Two hours a week, first semester.*

Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern English Grammar.

This course is intended specially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

Assistant Professor TATLOCK:—

English Literature. The Thirteenth and Fourteenth Centuries.

This course is open, without permission, to those only who take, or have taken, a course in Chaucer. It will deal mainly with pre-Chaucerian Middle English literature, and will consist in lectures and outside reading, with the purpose of illustrating Chaucer and the Middle Ages. Mediæval literature will be classified according to its various *genres* and origins; an account will be given of twelfth century Latin literature, of the chronicles, of the origins of the Arthurian and other romantic material, of the fabliaux, the legends and the like. The course may advantageously be taken by students of any modern literature or of mediæval history.—*Two hours, first semester.*

English Literature. From Chaucer to the Renaissance.

This course consists in lectures and outside reading on Wyclif, Chaucer, Gower, Langland, Mandeville, Malory, Skelton, the Scottish poets of the fifteenth and sixteenth centuries, and other writers, and on the native origins of the English drama.—*Two hours, second semester.*

*The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

Professor DEMMON and Assistant Professor STRAUSS:—
English Literature Seminary.

Each student is expected first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Areopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book 1; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Tennyson's Maud; Browning's The Ring and the Book; Swinburne's Atalanta in Calydon.—*Two hours, first semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; Richard III; the two parts of Henry IV; Henry V; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth; Coriolanus.—*Two hours, second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctly American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*One hour, throughout the year.*

Studies in the text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

4. Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

Assyrian.

1. Introduction to Easy Historical Inscriptions

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

2. Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Three hours a week, second semester.*

3. Babylonian Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

4. Religious Literature.

King's "The Prayers of the Lifting-up of the Hand." Craig's "Religious Texts."—*Two hours a week, second semester.*

History and Archæology.

1. Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

2. Lectures on the History of Israel and Judah

From earliest times to the Reformation of Ezra.

3. Lectures. Introduction to the Study of the Old Testament.

4. Lectures. Study of the Prophetic Books of the Old Testament.

5. Lectures. The Religion of the Semites.

6. Lectures. The Wisdom Literature of the Jews and comparison with similar productions by other peoples.

Arabic.**1. Introductory Course.**

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

2. Selected Suras from the Quran.

Chrestomathia Qurani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

Aramaic, Syriac, Ethiopic.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

Hellenistic Greek.**1. New Testament.**

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

2. Septuagint.**ROMANCE LANGUAGES AND LITERATURE.****FRENCH.**

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1905-1906.

Professor CANFIELD:—**[Poetry of the Nineteenth Century.]**

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discus-

sions. Open to undergraduates and graduates.—*Three hours a week, throughout the year.*

Omitted in 1906-1907.]

The History of the Novel in France.

This course will trace the growth of the novel as a form of literature and its various transformations. A number of representative masterpieces of different periods will be read, and both their technical qualities and their relation to the social and intellectual environments of the time will be studied. Particular attention will be given to the preparation and development of the movement of realism in the nineteenth century. Open to graduates and undergraduates.—*Three hours a week, throughout the year.*

Seminary in French Literature.

The early works of Victor Hugo. Various questions with regard to the sources, structure, style, etc., of these works will be examined.—*Two hours a week, throughout the year.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth, and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor EFFINGER:—

The Dramatic Literature of the Nineteenth Century.

The Drama of the Revolution; the Melodramatic Period; the Romantic Movement; the Modern Drama. Lectures, reading, and reports.—*Three hours a week, throughout the year.*

Assistant Professor THIEME:—

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

Dr. HAMILTON:—

Introduction to the Literature of the Old French period, reading of Old French texts.—*Two hours a week, first semester.*

PROVENCAL.

Dr. HAMILTON:—

Outline of the Grammar, with readings in Appel's *Provenzalische Chrestomathie*. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN.

The minimum requirement for admission to the courses announced below consists of courses 1 and 2 described in the University Calendar for 1905-1906, or an equivalent.

Professor LEVI:—

Dante: *La Vita Nuova*.

For undergraduates and graduates.

Dante: *La Divina Commedia*.

Lectures on the life and works of Dante with special reference to the interpretation of the *Divine Comedy*. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH.

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, described in the University Calendar for 1905-1906, or an equivalent.

Dr. WAGNER:—

Don Quixote.

In this course the masterpiece of Cervantes will be critically read and the manifold aspects of its significance studied.—*Two hours a week, second semester.*

Lope de Vega and the Classical Drama.

Representative masterpieces of the drama of the seventeenth century will be read and interpreted.—*Two hours a week, second semester.*

Outline of the History of Spanish Literature.

Lectures intended to accompany the foregoing courses and to offer such a view of the more important movements in Spanish literature that the works studied in them may be seen in their proper historical perspective.—*One hour a week, throughout the year.*

GERMANIC LANGUAGES AND LITERATURE.**GERMAN.**

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 10, and options in 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8, as described in the University Calendar for 1905-1906, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature in the second half of the Nineteenth Century.

Lectures, assigned readings and discussions.—*Two hours a week, the second semester.*

Proseminary in Modern German Literature.

The Storm and Stress Movement. Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Heinse, etc. The chief aim of this course is to acquaint the student with the methods of modern literary research. Primarily for graduates.—*Two hours a week, first semester.*

Teachers' Course.

Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

JOURNAL CLUB:—

Current Literature on Germanic Philology and Literature.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year, at which reports are made on the important contributions to Germanic philology and literature.

Assistant Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of Modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned

topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1906-1907; to be given in 1907-1908.]

Assistant Professor HILDNER:—

Hans Sachs.

Lectures and reports.—*Two hours a week, second semester.*

Dr. FLORER:—

The Early Writings of Lessing.

Lectures, investigations, and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Life and Works of Luther.

Lectures and reports. Special attention is paid to Luther's language. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Dr. BOUCKE:—

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and to give a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German, and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

GOTHIC.

Assistant Professor DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN.

Dr. BOUCKE:—

Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

PHONETICS.**The Elements of Phonetics.**

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

ENGLISH.

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In case of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The Development of the English Novel; The English Satirists of the Seventeenth and

Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

Old English.*

A general introduction to the subject.—*Two hours a week, first semester.*

Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern English Grammar.

This course is intended specially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

Assistant Professor TATLOCK:—

English Literature. The Thirteenth and Fourteenth Centuries.

This course is open, without permission, to those only who take, or have taken, a course in Chaucer. It will deal mainly with pre-Chaucerian Middle English literature, and will consist in lectures and outside reading, with the purpose of illustrating Chaucer and the Middle Ages. Mediæval literature will be classified according to its various *genres* and origins; an account will be given of twelfth century Latin literature, of the chronicles, of the origins of the Arthurian and other romantic material, of the fabliaux, the legends and the like. The course may advantageously be taken by students of any modern literature or of mediæval history.—*Two hours, first semester.*

English Literature. From Chaucer to the Renaissance.

This course consists in lectures and outside reading on Wyclif, Chaucer, Gower, Langland, Mandeville, Malory, Skelton, the Scottish poets of the fifteenth and sixteenth centuries, and other writers, and on the native origins of the English drama.—*Two hours, second semester.*

*The term "Old English" is used in this Announcement for the period of English often called "Anglo-Saxon."

Professor DEMMON and Assistant Professor STRAUSS:—
English Literature Seminary.

Each student is expected first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: More's Utopia; Bacon's Essays; Milton's Areopagitica; Carlyle's Sartor Resartus; George Eliot's Silas Marner; Spenser's Faery Queen, Book 1; Shakespeare's Sonnets; Milton's Paradise Lost; Dryden's Absalom and Achitophel; Pope's Essay on Man; Wordsworth's Excursion; Tennyson's Maud; Browning's The Ring and the Book; Swinburne's Atalanta in Calydon.—*Two hours, first semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: A Midsummer Night's Dream; The Merchant of Venice; As You Like It; Twelfth Night; The Tempest; Richard III; the two parts of Henry IV; Henry V; Romeo and Juliet; Hamlet; Othello; King Lear; Macbeth; Coriolanus.—*Two hours, second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctly American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*One hour, throughout the year.*

Studies in the text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

RHETORIC.

It is expected that graduate students will be reasonably proficient in writing. The study of composition, therefore, unless it is pursued with reference to the theory of teaching, is not regarded as a graduate study.

Mr. THOMAS:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

Newspaper Writing: Theory and Practice.

Intended for students who are preparing to do newspaper work. The class will prepare and publish, in the course of the semester, several issues of a daily paper.—*Two hours a week, first semester.*

Teachers' Course: Studies in the Theory of Style.

Analysis will be made of some of the most noted essays on style by authors representing the various points of view from which the subject has been considered. Among others, De Quincey, Spencer, Pater, and Stevenson will be taken up. This course will be conducted as a seminary.—*Two hours a week, second semester.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

The course is conducted as a seminary.

Mr. MORRILL:—

Principles of Style.

The purpose in this course is to discover, from a critical study of illustrative selections, the principles governing the structure of the composition, the choice of words, and the development of the idea, in the best modern prose. The relation of the writer to his work and to his public will receive some consideration. The selections are from Bunyan, Burke, Thackeray, Ruskin, Lowell, Carlyle, Newman, Addison, Macaulay, and others.—*Two hours a week, first semester.*

Reviews.

The aim of this course is to furnish instruction, and give practice, in the writing of book-reviews for newspapers and magazines

During the semester the class will edit and publish several issues of a weekly review. A few lectures on standards of criticism and methods of reviewing will be given at the beginning of the semester, and specimen reviews will be analyzed in detail.—*Two hours a week, second semester.*

The attention of graduate students is called to a course in the Philosophy of Rhetoric offered in the Department of Philosophy by Professor REBEC.

ORATORY.

Professor TRUEBLOOD:—

Study of Great Orators, ancient and modern.

Lectures on methods of public address and sources of power. Study of representative selections. The method is similar to that in the English Literature Seminary.—*Two hours a week, first semester.*

Oral Discussions.

This course is designed to develop readiness of extemporization. It involves the application of the principles of logic and elocution in the discussion of leading topics of the day. Students are required to present briefs of the subject discussed.—*Two hours a week, throughout the year.*

Shakespearean Reading.

Critical study and interpretative readings of four plays. Analysis of character, plot, and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes recited from the platform. Plays to be selected.—*Two hours a week, throughout the year.*

ART AND ARCHAEOLOGY.

A. THEORY OF ART.

Professor REBEC:—

Æsthetics.

Two hours a week, first semester.

Elect in the Department of Philosophy.

Principles and Problems in Æsthetic History.

Two hours a week, second semester.

Elect in the Department of Philosophy.

Seminary in Æsthetics.

Elect in the Department of Philosophy.

Professor WINKLER:—

Lessing's Laokoon.

Two hours a week, second semester.

Elect in the Department of German.

Schiller's Æsthetics.

Two hours a week, first semester.

Elect in the Department of German.

Mr. THOMAS:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

Elect in the Department of Rhetoric.

B. ART AND ARCHÆOLOGY.

Professor CRAIG:—

Interpretation of the Monuments of Babylonian and Assyrian Art.

Illustrated lectures.—Two hours a week, first semester.

Elect in the Department of Semitic Literature and History.

Professor D'OUGE:—

History of Greek Art.

Three hours a week, first semester.

Elect in the Department of Greek.

Professor KELSEY:—

The Topography and Monuments of Ancient Rome.

Three hours a week, second semester.

Elect in the Department of Latin.

Roman Art.

Illustrated lectures.—Three hours a week, second semester.

Elect in the Department of Latin.

MUSIC.

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the largest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

First Group.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

Second Group.

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY.

Professor HUDSON:—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, the partition of Africa, and the problems raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

The course given the first semester deals with the history of England from 1689 to 1815. The course given the second semester covers the period since 1815.—*Two hours a week, throughout the year.*

Professor Dow:—

Studies in Medieval and Early Modern European History.

This work consists of courses which extend over two years, and may be elected two years in succession. Courses 9a and 10a relate to the history of France, and chiefly to institutions. In the first semester a study is made of the institutions of the feudal period; in the second, attention is directed to changes that took place in the later medieval and early modern period. Courses 9b and 10b (9b the first semester and 10b the second) treat of the period of the Renaissance and the Reformation, and consist, like the other two, of a series of logically related special studies. The aim of the work, aside from gaining an intensive knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied especially in preparing oral and written reports.—*Two hours a week, throughout the year.*

Seminary in Medieval History.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatic, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.—*Two hours a week, throughout the year.*

Assistant Professor CROSS:—

Studies in English History since the Reformation.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which is primarily concerned with the separation from Rome under Henry VIII, and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the

Restoration, with particular reference to Parliament and the Church are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689.

Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents.

The course for 1906-1907 deals with the period of Henry VIII. and Elizabeth.—*Two hours a week, throughout the year.*

AMERICAN HISTORY.

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extending over two years and a half, beginning with lectures on colonial history, and ending with a seminary in which special problems are investigated in original material. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American History, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history.

Assistant Professor VAN TYNE:—

American Colonial History.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.—*Three times a week, second semester.*

United States History from the Beginning of the Civil War (1860) to the Present Time.

In addition to the political and constitutional questions of the war and reconstruction periods, the lectures will deal with the social and economic conditions existing in the North and the South both during those periods and after. The race question, the "Solid South," the industrial expansion, and the evolution of the United States into a world power will be treated. The lectures will be amplified by assigned reading and special papers.—*Three times a week, first semester.*

Studies in American History.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Important social, economic, and political problems not fully treated in the regular lecture courses are chiefly selected for treatment. Written and oral reports are prepared under the direction of the instructor. Special facilities are given for the use of the library.—*Two hours a week, throughout the year.*

Professor McLAUGHLIN:—

Constitutional and Political History of the United States, 1775-1861.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort also is made to trace the political and social development of the country.—*Three times a week, throughout the year.*

Seminary in American History.

This course is primarily for graduate students who have already done considerable historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. Graduate students will receive individual attention and assistance in the prosecution of their investigations.—*Two hours a week, throughout the year.*

GOVERNMENT.

Professor HUDSON :—

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Assistant Professor FAIRLIE :—

National Administration.

This course is a study of the national administration of the United States, compared with that of the principal European countries. It begins with an examination of the administrative powers of the President and Senate and those of other chief executives and executive councils. Each of the nine Executive Departments in the United States government and the various administrative services connected with them will be considered and compared with the corresponding departments and services in other governments. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service, and in comparison with the systems of professional training and examinations in Great Britain, Germany and France. A brief survey will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the working of the governmental machinery, will be investigated and discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor and other State officers and institutions, and local administration in the counties, townships, and cities. Election

methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, first semester.*

Comparative Administrative Law.

In this course, special attention will be given to English local administration, showing the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the combination of bureaucratic and popular administration in Prussia, and the system of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Three hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands

of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties and their machinery, recent legislation concerning primaries, reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Seminary in Administration.

These are courses for original research on special topics. During the year 1906-1907 a study will be made of State administration in Michigan. Special arrangements may also be made with students for work on other topics.—*Two hours a week, each semester.*

Additional advanced courses in Public Law are offered in the Law Department, viz.: Constitutional Law, Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

PHILOSOPHY.

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

For the provisions in regard to the fellowship in philosophy, see page 23.

In the work announced below the several teachers expect to have the cooperation of Mr. VIBBERT and Mr. SELLARS in philosophy, and of Mr. SHEPARD in psychology. At the time, however, when this Announcement goes to press, it is not possible to state precisely what their part in the work will be. For the final arrangement of work see the general announcement of the Department of Literature, Science, and the Arts. This will be issued in two editions later in the year.

A. SEMINARIES.

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD.

History of Philosophy, Professor LLOYD.

Ethics, Professors WENLEY and LLOYD.

Modern Systems, Professors WENLEY and LLOYD.

Ancient Philosophy, Professors WENLEY and REBEC.

Philosophy of Religion, Professor WENLEY.

Æsthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD.

Logic, Professor REBEC.

Psychology, Rational and Experimental, Professor PILLSBURY.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been shelved in the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY.

Professor WENLEY:—

*The Philosophy of Kant.

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

*The Philosophy of Hegel.

Study of the Logic and discussions.—*Two hours a week, second semester.*

Professor LLOYD:—

*Philosophy since Hegel.

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Professor REBEC:—

*American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

*Plato's Republic.

Collateral reading and theses.—*Two hours a week, first semester.*

*Starred courses should not be elected without consultation.

C. ETHICS.

Professor REBEC:—

*Aristotle's Ethics.

Collateral reading and theses.—*Two hours a week, second semester.*

D. PSYCHOLOGY.

The Psychological Laboratory is well equipped for original investigation; and its facilities have been recently improved by removal to new quarters. See page 18.

Professor PILLSBURY:—

Original Investigation.

Hours as may be assigned, throughout the year.

E. SPECIAL COURSES.

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1905-06 to the question of the possibilities of a realistic expression.—*Two hours a week, first semester.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1906-07 to the philosophy of evolution.—*Two hours a week, second semester.*

Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

THE SCIENCE AND THE ART OF TEACHING.**Professor WHITNEY:—**

History of Education, Ancient, Medieval, and Modern.

Recitations, assigned readings, reports and discussions. Text-book: Monroe's History of Education.—*Four hours a week, first semester.*

Primarily for juniors. Advanced students will be assigned additional reading.

School Administration.

Lectures, readings, reports. Advanced students will make a comparative study of foreign school system.—*Two hours a week, both semesters.*

Philosophy of Education.

Recitations and lectures. Text-book: Rozenkranz's Philosophy of Education.—*Two hours a week.*

Social Education.

This course embraces a consideration of the school as a social factor in its relation to the child, the home, the state and the church. Also a discussion of the relation of education to vocation and crime. Lectures and recitations.—*Two hours a week, second semester.*

Assistant Professor DE LAGUNA:—

Philosophy of Education.

The general basis of educational policy. Lectures, recitations, and supplementary reading.—*Three hours a week, second semester.*

Primarily for juniors. Advanced students may be assigned additional reading.

Theoretical and Critical Pedagogy.

The application of functional psychology to problems in general method. Text-book: Thorndike's Principles of Teaching. Angell's Psychology will be used for constant reference.—*Two hours a week, first semester.*

Philosophy 7 (Elementary Psychology) or its equivalent must precede this course.

Educational Theories of the Greek Philosophers.

Xenophon's Memorabilia; Plato's Protagoras and Republic; Burnet's Aristotle on Education; Mahaffy's Old Greek Education. *Two hours a week, first semester.*

Rousseau, Pestalozzi, and Spencer.

A critical study of Rousseau's *Emile*, Pestalozzi's *How Gertrude Teaches her Children*, and Spencer's *Education*.—*Two hours a week, first semester.*

Herbart.

Exposition and criticism of the Herbartan pedagogy.—*Two hours a week, second semester.*

Rapid Reading of German Pedagogy.

Reading and discussion of selected texts.—*One hour a week, first semester.*

Educational Classics of the Renaissance and Enlightenment.

Two hours a week, second semester.

POLITICAL ECONOMY, SOCIOLOGY, INDUSTRY AND COMMERCE.

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy" or "Social and Industrial Reforms." For descriptions see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as Graduate Courses are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

POLITICAL ECONOMY.

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions.—*Two hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. For the first semester the seminary will investigate special problems in transportation; for the second semester special problems in social reform.

Professor TAYLOR:—

Principles of Finance.

In this connection the word finance is used in the technical rather than the popular sense. That is, it does not include money, banking, stock speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial consideration, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the media of exchange, including money and its various credit substitutes. This is followed by a study of the natural laws governing mone-

tary phenomena, such as those which fix the monetary standard, those regulating the movement and distribution of money, and so on. Next comes a sketch of monetary history,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking instruments and operation. This is followed by a study of banking, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the history of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

History of Political Economy. .

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the nature of capital, the origin of interest, the laws of value, and so on. The work of the class hour includes the discussion of readings assigned to the class generally and of reports on readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of economic theory, and so on.—*Two hours a week, second semester.*

SOCIOLOGY.

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements and other sociological questions of present interest.

The class is supplied with a list of about fifty topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

The Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order*, Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field will be used. This course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, throughout the year.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient.—*First and second semesters.*

INDUSTRY AND COMMERCE.

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States.

The latter part of the semester is occupied with studies in the industries connected with American agriculture, forestry and mining.—*Three hours a week, first semester.*

The Manufactures of the United States.

The history, methods, present location and condition of our chief manufacturing industries will be presented, the relation of these industries to one another, and to sources of raw materials, means of transportation, market facilities, and foreign trade.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, known as middlemen, who are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

After a preliminary consideration of the institutes of commerce, the systems used in marketing grain, cotton, tobacco, live stock, dairy products, fruits and wool are studied.—*Two hours a week, first semester.*

b. The Manufacturer's Problem of Distribution.

Two hours a week, second semester.

c. Wholesale Trade.

A detailed account of the principles and practices of modern wholesale trade.—*Two hours a week, first semester.*

d. Retail Trade.

The department store is given special attention.—*Two hours a week, second semester.*

Assistant Professor GLOVER:—

Mathematics of Insurance.

In connection with the course in Higher Commercial Education six courses are offered upon the actuarial phases and technique of insurance. The theory of the valuation of securities is also presented. For students in this line a statistical laboratory equipped with all necessary computing machines is available. For further information regarding courses in insurance see this Announcement under Mathematics.

A course of lectures on Insurance Law given in the Law Department is open to students in the Department of Literature, Science, and the Arts by special arrangement.

Doctor SMALLEY:—

Corporations.

This course undertakes a study of corporations as a phase of industrial society. It considers the functions of the promoter and underwriter, the organization of corporations under general laws, corporate securities and management, receiverships and reorganizations. It pays particular attention to those problems—such as promoter's liability, over-capitalization, protection of minority interests, corporation wrecking, etc.—to which the growth of corporations has given rise, and discusses the various programs of public supervision and control.—*Two hours a week, first semester.*

Government Control of Industry.

The aim of this course is to consider industrial regulation from the legal point of view. A study is made of the power of government, under our constitutional system, to control industrial action. This involves, in the main, a discussion of the legal doctrines of the police power and of public policy, as far as they are of economic importance, special attention being paid to their bearing upon the solution of the problems of labor and capital, trusts, railroads, and so forth.—*Two hours a week, second semester.*

INTERNATIONAL LAW.

The courses in international law presupposes a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

MATHEMATICS.

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

This course forms a direct continuation of the course in elementary mechanics; it is mainly devoted to the dynamics of a rigid body.—*Three hours a week, second semester.*

Professor MARKLEY:—

Projective Geometry.

This course begins with the pure geometry of position, Reye's work being used as a text, this is followed by the analytic treatment, with the aid of homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Assistant Professor GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots, resultants, solution of a system of n linear equations, theorems concerning integral functions of one and two variables, and elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Dr. PIERCE:—

Elementary Theory of Differential Equations.

A lecture course with references to available literature on the subject. Particular attention will be given to the ideas of Lie.—*Three hours a week, throughout the year.*

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Goursat's *Cours d'analyse mathématique*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—**Theory of the Potential.**

Beginning with simple problems in attraction, the course develops the fundamental properties of the potential function; then the general theory of vector fields is discussed and applied to some particular branch of mathematical physics.—*Three hours a week, first semester.*

Harmonic Analysis.

Two hours a week, throughout the year.

Professor MARKLEY:—**Theory of Functions.**

The first part of this course deals with functions of real variables in which are developed the fundamental ideas of irrational numbers, continuity, and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometrical representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Two hours a week, throughout the year.*

Theory of Functions. [Advanced Course.]

This course is a direct continuation of the preceding. It includes the theory of elliptic functions.—*Two hours a week, throughout the year.*

Assistant Professor GLOVER:—**Seminary in Insurance.**

This course is designed for graduate students who wish to study some of the more advanced problems relating to life contingencies. The following, among others, will be considered: Lexis's theory of population, old age pensions, sickness insurance, theory of risk, Pearson's method of moments, theory of correlation, graduation of mortality and sickness tables, theory of selection, and distribution of surplus.

Hours to be arranged, throughout the year.

PHYSICS.

The courses announced below presuppose about one and a half years' collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—**Electricity.**

An intermediate course based on J. J. Thomson's *Electricity and Magnetism*.—*Two hours a week, first semester.*

Electrochemistry.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.—*Three hours a week, second semester.*

Professor REED:—**The Theory of Sound.**

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—*Lectures, two hours a week; laboratory work, twice a week, first semester.*

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—*Lectures and recitations, two hours a week; laboratory work, twice a week, second semester.*

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester.*

Professor PATTERSON:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distribution, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week, first semester; twice a week, second semester.*

NOTE: For courses in Applied Electricity, see Electrical Engineering in the Announcement of the Department of Engineering. Seventeen courses in all are there described in detail. They cover the theory, testing and design of electric machinery, transformers, lamps, storage batteries, telegraphy, telephony, electric distribution, power plants, railways, etc. Many of these courses, for example, those in dynamo-electric machinery (both direct and alternating current), in alternating current phenomena, etc., have frequently been accepted toward advanced degrees.

Dr. RANDALL:—

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, first semester.*

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations *two hours a week, second semester.* This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of those principles to numerous problems in physics and chemistry.

Dr. SMITH:—

Electrical Measurements.

This course comprises, in addition to all the refined methods

of measuring resistance, current, and electromotive force, a thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester*; *three times a week, second semester*.

Professors CARHART and REED:—

Physical Colloquium.

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

CHEMISTRY

Resident graduates may enter upon any of the courses in chemistry in this University for which they are qualified. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to Courses 1, 2, 3, 5 and 7 (University Calendar for 1905-1906), making in all about twenty-five hours of undergraduate credit.* If chemistry is taken as a minor subject by a student registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1, 2 and 3.

Graduate students who are not candidates for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for the convenience of readers.

Professor JOHNSON:—

Advanced Qualitative Analysis.

Following undergraduate Course 3 (University Calendar for 1905-1906).

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during the semester.

Professor CAMPBELL:—**Chemical Colloquium.**

The Chemical Colloquium meets twice a month. Each member of the teaching staff has an opportunity to present at some meeting during the year an account of recent research work in the field in which he is particularly interested.

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1905-1906) or its equivalent. Laboratory work, directed by lectures, in some chosen field of analytical research.

Research in Chemical Technology.

(In conjunction with Assistant Professor WHITE).

The laboratory is equipped for research along the following lines:

1. Influence of heat and mechanical treatment on the constitution of iron and steel.
2. Manufacture of Portland cement with special reference to the influence of composition and temperature of burning upon the physical properties of the finished cement.
3. Destructive distillation of coal, with special reference to the manufacture of gas.
4. Electrometallurgy and applied electrochemistry.
5. Gas analysis, calorimetry and photometry.
6. Assaying of gold and silver ores and research in the technical treatment of ores.

Professor GOMBERG:—**Lectures on the Chemistry of Carbon Compounds.**

A beginning course with library studies.—*Five times a week, the first semester.*

Seminary in Special Topics in Organic Chemistry.

Following undergraduate Course 7 (University Calendar for 1905-1906) or its equivalent.—*Two times a week, second semester.*

Organic Synthesis and Ultimate Analysis.

(In conjunction with Dr. CONE).

Laboratory work.

Investigation in Organic Chemistry.

(In conjunction with Dr. CONE).

Professor SCHLOTTERBECK :—**Phytochemical Research.**

Laboratory investigation of the chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.

Professor BIGELOW :—**Physical and Theoretical Chemistry.**

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—Lectures, *four hours a week, second semester.*

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Laboratory Research in Physical and Electrochemistry.**Assistant Professor STEVENS :—****Drug Assaying, and Pharmacopœial Standards.**

Laboratory work.

Assistant Professor WHITE :—**Chemical Technology.**

Lectures on the main chemical industries, inorganic in the *first semester*, and organic in the *second semester*. Among the subjects treated are utilization of fuel, purification of water, the alkali and acid industries, electrochemistry, cement, wood and coal distillations, sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Research in Chemical Technology.

(In conjunction with Professor CAMPBELL, as given above).

Dr. LICHTY :—

Laboratory Work with the Polariscopes and the Spectroscopes.

Laboratory Research in Inorganic Chemistry.**Dr. DUNLAP :—****Organic Analysis.**

The technical examination of various organic industrial pro-

ducts, such as oils, fats, waxes, food-stuffs, etc. For those having sufficient preparation, this course may be taken as a research course on some organic-technical problem.

Mr. SMEATON:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Laboratory Research in Cryoscopic Methods.

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Stereochemistry, including a General Study of Isomerism.

Lectures, twice a week, second semester.

The Heterocyclic Derivatives in Organic Chemistry.

Lectures, twice a week, second semester.

[This course alternates with the course in Stereochemistry.]

Dr. CONE:—

The Chemistry of Organic Dyes.

Lectures and reading, twice a week, first semester.

Organic Synthesis and Ultimate Analysis.

(In conjunction with Professor GOMBERG, as given above).

Investigation in Organic Chemistry.

(In conjunction with Professor GOMBERG, as given above).

Dr. BALCOM:—

Inorganic Chemistry.

Lectures, reading and reports.

Laboratory Research in Inorganic Chemistry

Mr. ZIMMERSCHIED:—

Quantitative Analysis.

Laboratory work.

Micrometallography.

Lectures and laboratory work. *Second semester only.*

Mr. WILLARD:—

Chemistry of the Rare Elements,
including a study of their occurrence, uses, reactions and qualitative
detection.—*Second semester only.*

Dr. LIND:—

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and the Phase Rule.—Lectures, *three hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies
of solutions, dissociation, conductivity, polariscope, spectroscope,
etc.—*Four times a week, both semesters.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposi-
tion potentials, etc.—*One lecture and two laboratory periods a week.*

Thermometry.

Calibrations and high temperature; measurements by all
standard methods.—*One lecture and one laboratory period a week.*

Theory and Practice of Exact Measurements,

with laboratory practice in glass blowing, calibration, and construc-
tion of apparatus.—*One lecture and two laboratory periods.*

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY.

The courses here announced presupposes that the student taking
them is prepared for original research.

Professor VAUGHAN:—

1. Food Analysis.

2. Water Analysis.

3. Research on the Chemistry of Bacteria.

Students doing graduate work in these subjects will be required
to work in each subject for at least one year.

Professor Novy:—

1. Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1905-1906.—*Hours arranged with instructor, either first or second semester.*

2. Pathogenic Protozoa.

A study of the distribution and means of transmission of the protozoal diseases. The laboratory work will cover the diagnostic and cultivation methods and such work with the insect hosts as will be practicable.

3. Advanced Physiological Chemistry.

Laboratory work and reading.—*Hours arranged with instructor, either first or second semester.*

ASTRONOMY.

Courses 1 and 2 are designed to give a general view of modern Astronomy. They are mainly descriptive and may be taken one as the continuation of the other, or independently, as desired.

Courses 3 and 4 treat of the theory and practice of making and reducing astronomical observations. These courses require day and night work at the Observatory during a portion of the semester.

A knowledge of Integral Calculus is necessary for Courses 5, 6, and 7.

Professor HUSSEY:—

1. General Astronomy. The Solar System.

Two hours, first semester.

2. General Astronomy. The Stellar System.

Two hours, second semester.

3. Spherical and Practical Astronomy.

Use of sextant and zenith telescope. This course includes problems often encountered by the engineer, such as time, latitude, longitude, and azimuth determinations.—*Two hours, both semesters.*

4. Advanced Practical Course.

Work with the equatorial. Open to those who have had Course 3 or its equivalent.—*Hours and credit to be arranged, both semesters.*

5. Theoretical Astronomy.

An elementary practical course in Mathematical Astronomy, including the general principles of Celestial Mechanics, and the theory and practice of determining parabolic and elliptic orbits.—*Three or four hours, both semesters.*

6. Method of Least Squares.

Theory of Errors and the Adjustment of Observations.—*Two hours, second semester.*

7. Advanced Theoretical Astronomy.

Special and general perturbations and mathematical theory in continuation of Course 5.—*Hours and credit to be arranged, both semesters.*

MINERALOGY

The courses in mineralogy presuppose a knowledge of general inorganic and analytical chemistry, as well as the principles of general geology.

Assistant Professor KRAUS:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—*Lectures five times a week, laboratory work, five hours a week, first semester.*

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by means of the physical properties a very large number of minerals.—*Laboratory work, six hours a week, first and second semesters.*

Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first and second semesters.*

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer.—Laboratory work, *nine hours a week, first and second semesters.*

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic optical instruments.—*Two lectures and two hours laboratory work a week, second semester.*

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, or the formation and origin of minerals.

GEOLOGY.

The course of instruction in geology for undergraduates, as announced in the University Calendar, embraces from two to three years University work. The first year is devoted to elementary studies in physical geology, historical geology, and physical geography, giving three hours a week to each for one semester. During the second year more detailed instruction is given, two hours each week, in the same general subjects. Each student is given a special subject for investigation in connection with which a thesis of about 2,500 words is required. During the second semester palæontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary courses have been pursued. Those who have done more work than is represented by the elementary course may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of geology will be read with special reference to Pleistocene geology, and to the origin and classification of topographic forms, glacial records, lake histories, volcanoes, erosion, and other processes by which the surface of the earth has come to have its present form.

The museum contains a series of fossils selected to illustrate the geological history of North America. This collection is intended especially for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lectures will be returned to the cases in the museum, where they will be available for examination at any time.

There is a second collection embracing ten thousand specimens of both American and European fossils, which is arranged zoologically and intended for the use of advanced students in palæontology. Special collections of rocks, brachiopods, corals, etc., numbering from one hundred and fifty to two hundred specimens each, are arranged in the geological laboratory for the immediate use of students.

The collection in physical geology contains a well selected series of specimens to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them in cases provided and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopes and photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

The work in geology is conducted by, or under the direction of, Professor RUSSELL.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can readily omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on p. 16. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctor's degree a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more

important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptation. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours per week, throughout the year.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Dr. _____.

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.

This is a year's course, but is so divided that the two parts are given in the first semester of alternate years. Course 4a deals with Protozoa, coelenterates, worms, crustaceans, and several smaller groups. Course 4b includes molluscs, echinoderms, myriapods, arachnids, and insects.

Course 4a will be given in 1906-1907.—*Four hours.*

Morphogenesis.

This course consists of lectures and discussions on the factors of development, regeneration, and the general subject of form-regulation. Results of experimental work in embryology will be discussed in relation to the theories of development that have been advanced. Open to students who have taken Course 9 in Embryology or other work which affords an adequate preparation for the study of the subjects treated.—*One hour, first semester.*

Evolution Problems.

Lectures, reading, and conferences. This course aims to give a critical appreciation of the development of the evolution theory since Darwin and of the bearing of that development on other fields of knowledge. The theory of evolution has so profoundly influenced psychology, ethics, and social science, to say nothing of other fields, that an acquaintance with the ground and import of this theory is a necessary part of the equipment of the student in any of these fields, as well as of the biologist who has an interest in the broader aspects of his subject. It is the purpose of the course to give the student the necessary basis for appreciating in some degree the import of biology.—*Two hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each

is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Two hours.*

Dr. ———.

Embryology of Vertebrates.

The course deals chiefly with the development of the organs. Much attention is given to methods of studying serial sections, and to the preparation of anatomical descriptions and drawings from such sections. The lectures treat of vertebrate development from the comparative standpoint. Laboratory work, on the chick, with much supplementary demonstration.

This course may be elected as *four hours* (two lectures and two laboratory periods), or as *six hours* (three lectures and three laboratory periods).—*First semester.*

Mr. Charles C. ADAMS:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology. The lectures and conferences outline the general principles.

The field trips are devoted to the study of the animals, the conditions under which they live; methods of observation, taking notes and collecting; special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and to amphibians and reptiles among verte-

brates. One class meeting and two afternoons laboratory or field work each week.—*Three hours, second semester.*

Dr. PEARL:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals,—those features of the life process that are common to organisms. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures per week and two half days of laboratory work.

Some acquaintance with physical chemistry will be found valuable for those who intend to pay especial attention to the physiological side of biological science; for any extensive progress in this direction such acquaintance is indispensable.

Students who have had one year's work in Biology (Botany or Zoology) are permitted to take this course. It may appropriately be taken in the second semester of the same year in which Invertebrate Zoology (Course 4) is taken.—*Four hours per week.*

Statistical Zoology.

The course deals with the methods and important results of the statistical study of variation. Especial attention is paid to the methods used in this work, the aim being to give the student a knowledge of the manner in which biological statistics are collected and treated. To this end exercises in handling statistics gathered from various sources will be assigned. The significance of the results which have been obtained by the use of the statistical method, with reference to current theories of heredity, etc., will be discussed.

Individual laboratory work to accompany the lectures may be arranged. Each student will be assigned a definite, small problem for investigation. In the assignment of these problems special attention will be paid to types found abundantly in the local fauna.—*Hours and credit to be arranged, throughout the year.*

Heredity.

This course gives an exposition and critical discussion of the results of recent investigation in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that the course in Organic Evolution be taken concurrently. This course should be of value to students specializing in sociology, psychology, and medicine, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or physiology. Laboratory work, lectures, and quizzes.—*Four hours per week, second semester.*

Vertebrate Comparative Anatomy.

This course is supplementary to mammalian anatomy and may be taken only in connection with it or subsequent to it. It consists of *one lecture, and one laboratory period*. The laboratory exercises, chiefly demonstrations, are on other forms than the cat. The lectures deal with comparative anatomy.

Only a part of the subject will be covered in any one year, so that the course falls into three parts: 5a, bones and muscles; 5b, Nervous system, integument and sense organs; 5c, circulatory, respiratory, urinogenital and digestive organs. Course 5a is given in 1906-1907.

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.

Dr. ———.

The Experimental Study of Asymmetry.

Dr. ———.

Habits of Insects,—Particularly Certain Hymenoptera.

The ZOOLOGICAL FACULTY:—**Journal Club.**

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—*One hour a week, throughout the year.*

The BIRD CLUB:—

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

BOTANY

The work in botany in this University is divisible into morphology, physiology, and ecology. For the study of these branches there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. A plant garden on the campus, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to the preparation and the needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctor's degree, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found elsewhere in this Announcement. (See page 7.)

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below.

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours' laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five credit hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more credit hours a week, throughout the year.*

Teachers' Course.

Conference and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations.—*One credit hour a week, second semester.*

Dr. POLLOCK:—

Morphology and Classification of Fungi.

Three credit hours a week, first semester.

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three credit hours a week, second semester.*

Dr. BURNS:—

Biological Relations of Plants.

Lectures, with reviews of recent literature of ecology and distribution, accompanied by field studies of habits and adaptations, and laboratory work on ecological anatomy. *Two hours a week, first semester.* By permission, students who are prepared to take up special problems may elect this course as *three or more hours.*

Variation under Natural and Artificial Conditions.

Plant breeding. Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two credit hours a week, first semester.*

Ecology.

A study of the habits and adaptation of plants. The floras of hills and valleys, of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more credit hours a week, second semester.*

Botanical Survey of the Huron Valley.

A limited number of students will be given opportunity to take part in a systematic study of the local flora.—*Two or more hours a week, second semester.*

The BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

Biological Problems and Theories.

This course consists of one lecture a week during the second semester on current problems and theories in biology, such as the origin of life, heredity, morphogenesis, mutation, inheritance in hybrids, mechanism and vitalism, senescence and death.

B. PRIMARILY FOR GRADUATES.

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Dr. POLLOCK:—

Investigations in the Morphology and Physiology of Fungi and in Plant Pathology.

Dr. BURNS:—

Investigations in Ecology and Experimental Morphology.
Problems in field and laboratory work.

FORESTRY.

Assistant Professor MULFORD:—

Silviculture.

This course is given as follows:

(1a) Silviculture. Introductory, including the study of soil, climate and other conditions.—*Three hours, first semester.*

(1b) Silviculture. Method of artificial and natural reproduction; seedbed and nursery work; planting and sowing in forest; reforestation of denuded lands, prairies, dunes, etc.—*Three hours, second semester.*

(1c) Silviculture. Care of forests; cleaning and thinning; protection of forests against insects and other enemies.—*Three hours, first semester.*

Courses 1a, 1b, and 1c should be taken in the order here given.

Forest Mensuration and Description.

Lectures, laboratory work, and field work.—*Three hours, throughout the year.*

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurements of the rate of growth of trees and stands; methods and manner of describing a tract of forest; forest survey.

Open only to students of forestry in first year.

Dendrology.

Monographic study of forest trees; their life history, distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory work and field work.—*Three hours, second semester.*

Open only to forestry students in first year.

Professor ROTH:—

Forest Utilization.

Use of timber; points of production and market; method of lumbering, milling, and marketing; minor forest industries. Lectures.—*Four hours, second semester.*

Open only to forestry students in their second year.

Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved in judging the value of the forests and forest operations. Lectures and field work.—*Five hours, throughout the year.*

Open only to forestry students in their second year.

ANATOMY AND HISTOLOGY.

Professors McMURRICH and HUBER:—

1. Anatomy of the Central Nervous System.

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have taken anatomy Course 4 or an equivalent.—*Three hours, first or second semester.*

2. Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in histology.—*Hours to be arranged with the instructor, throughout the year.*

3. Anatomical Research.

4. Histological Research.

These courses are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY.

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a minor for the master's degree is five hours of lectures the first semester, four hours the second semester, a laboratory course of five afternoons a week for eight weeks, the first semester, and a report on the literature of some limited subject. The four hour lecture course given in the second semester, should be taken before the five hour course of the first semester. No research work will be required, except from those who have already taken advanced work in physiology. The requirements for a major for the master's degree includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirements for a minor for a doctor's degree involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a major for the doctor's degree is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, biology, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; four hours a week, second semester.

Laboratory Course.

Fifteen hours a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

HIGHER DEGREES CONFERRED IN 1905

MASTER OF SCIENCE

(IN FORESTRY)

Wesley Bradfield, A.B., *Alma College*

Cary LeRoy Hill, A. B.

George Wilcox Peavy, B.L.

Joseph DeWitt Warner, A.B.,
Cornell University

Edmund John Zavitz, A.B.,
McMaster University

MASTER OF ARTS

Carrie Augusta Barden, B.S.,
Upper Iowa University

George W. Brail, A. B.,
Albion College

Agnes Ewing Brown, B.S.,
University of South Dakota

Charles Robert Cobb, A.B.,
Greenville College

John Leonard Conger, A.B.

Mary Ellen Duffy, Ph.B.

Charles Henry Estrich, A.B.,
Ohio Wesleyan University

Adelaide Gemberling, A.B.

Maudelle Margaret Germonde,
B.L., *Ohio Wesleyan University*

Carrie May Gilpin, A.B.,
Albion College

Clarence Wilson Greene, A.B.

James Floyd Halliday, A.B.

Flora Elsie Hill, B.L.

Lemuel Guy Holbrook, Ph.B.

Walter Fred Hunt, A.B.

Genevieve Imus, A.B.

Clara Octavia Jamieson, A.B.

Allen Marshall Kline, A.B.

William Jacob Lehman, A.B.,
LL.B.

Dale Livingstone, A.B.

Herman William March, A.B.

Vernon Griffith Mays, Ph.B., *Albion College*

John Edward Mealley, B.S.,
Albion College

William Daniel Moriarty, A.B.

Frances Elisabeth Nichols, A.B.,
Middlebury College

Thomas Ernest Rankin, A.B.

Arthur McBride Ransom, M.S.,
Alabama Polytechnic Institute

Henry Jasper Richmond, A.B.

James Marion Robb, A.B.,
Greenville College

Hideo Sakuma.

Doshisha University

Roda Selleck, A.B.

Elisabeth Ethel Sinclair, A.B.

Carrie Lucile Stone, A.B.

Richard Ryan Thompson, A.B.,
South Western Baptist University

Harry Norton Torrey, B.S.,
Knox College

Ora Travis, A.B.

Perry Fox Trowbridge, Ph.B.

Lucia Isabelle Voorhees, A.B.

Bess May Vrooman, A.B.

Guy Leslie Wait, A.B.

Hobart Hurd Willard, A.B.

DOCTOR OF PHILOSOPHY

- Henry Herbert Armstrong, A.B., 1901, A.M., 1902
 Latin; Greek; Roman Law
Thesis, The Autobiographical Element in Latin Inscriptions
- Lee Holt Cone, B. S., *Pomona College*, 1901
 Organic Chemistry; Physical Chemistry; Physics
Thesis, Some Reactions of Triphenylmethyl
- Charles Albert Davis, A.B., *Bowdoin College*, 1886, A. M., *ibid.*, 1889
 Botany; Geology; Ecology
Thesis, The Ecology of Peat Forming Plants in Michigan
- Jean Dawson, A.B., 1902, A.M., 1903
 Zoology; Animal Ecology; Plant Ecology
Thesis, The Ecology and Behavior of Physa
- George Oswin Higley, A.B., 1891, M.S., 1893
 General Chemistry; Physiology; Physiological Chemistry
Thesis, A New Chemograph and some of its Applications
- John William Scholl, A.B., 1891, A.M., 1902
 German Literature; Germanic Philology; General Linguistics
Thesis, Friedrich Schlegel and Goethe: A Study in Early German Romanticism
- Orrin Edward Tiffany, A.B., 1895, A.M., 1896
 American History; Political Economy; Commerce and Industry
Thesis, The Relations of the United States to the Canadian Rebellion of 1837-1838

HOLDERS OF FELLOWSHIPS 1905-1906

- Joel Martin Barnes,¹ B.S., *Gas Engineering Fellow*
- Chester Sherman Carney,² *Chicago Commons Scholar*
- Alfred Dachnowski, A.M., *Angeline Bradford Whittier Fellow in Botany*
- John Sharpless Fox, A.B., *Peter White Fellow in American History*
- Charles Edwin Galloway, A.B., *George S. Morris Fellow in Philosophy*
- Rufus Percival Hibbard, A.B., *Dexter M. Ferry Fellow in Botany*
- Horace John Howk,³ *Parke, Davis and Company Fellow in Chemistry*
- Rudolf Ernest Knapp,³ B.S., *Rockefeller Fellow in Hygiene and Bacteriology*
- Elisabeth Ethel Sinclair, A.M., *Newberry Classical Fellow*
- Mary Louise Smith, A.B., *Peter White Classical Fellow*
- Lewis Eugene Warren,⁴ Ph.C., *Stearns Fellow in Pharmaceutical Chemistry*
- John G. Winter, A.M., *Buhl Classical Fellow*
- Laura Bayne Woodruff, A.M., *Buhl Classical Fellow*

¹ Registered in the Department of Engineering.

² Pursuing undergraduate work in the Department of Literature, Science, and the Arts.

³ Registered in the Department of Medicine.

⁴ Registered in the Department of Pharmacy.

STUDENTS' IN THE GRADUATE SCHOOL, 1905-1906

SUMMER SESSION OF 1905²

NAME	RESIDENCE
* Mary Elizabeth Alcott, Ph.B., <i>University of Minnesota</i> , 1901 English; Rhetoric; English Philology	<i>Ann Arbor</i>
Frank Eugene Andrews, B.S., 1900 Physics; Mathematics; Electrical Engineering	<i>Ypsilanti</i>
Anna May Lamb Bates, A.B., 1901 Latin; Greek; German	<i>Charlotte</i>
Walter Henry Blome, Ph.C., 1898, B.S., 1902. M.S., 1905 Organic Chemistry; Analytical Chemistry; Botany	<i>Ann Arbor</i>
Ella Bourne, Ph.B., <i>De Pauw University</i> , 1893, Ph.M., 1897 Latin; German; Ancient Ethics	<i>Greenfield, Ind.</i>
Amy Louisa Broome, A.B., 1902 German; English	<i>Faribault, Minn.</i>
Charles William Burrows, A.B., 1898, A.M., 1901 Physics; Mathematics; Physical Chemistry	<i>Ann Arbor</i>
Walter Francis Colby, A.B., 1901 Physics; Mathematics; Mechanics	<i>Hart</i>
Charles Dean Cool, A.B., 1899, A. M., <i>Harvard University</i> , 1900 French Literature; Italian; Spanish	<i>Decatur, Ill.</i>
Joseph Henry Corns, A.B., 1901 Latin; Greek; Pedagogy	<i>Detroit</i>
Mary Belle Cox, A.B., 1904 Modern European History; American History; English Literature	<i>Huntington, Ind.</i>
Albert Robinson Crittenden, A.B., 1894, A.M., 1902 Latin; Ancient Philosophy; General Linguistics	<i>Olivet</i>
Grace Louise St. John Eaton, A.B., 1904 Greek; Roman Political Institutions; Roman Literature	<i>Corunna</i>
William Andrew Ferguson, A.B., 1904 Physics; Analytical Chemistry; Mathematics	<i>Niles</i>
Wilbur Fisk Jackman, B.S., 1886, Ph.C., 1887 Mineralogy; English; Physical Chemistry	<i>Orono, Me.</i>
Henri Clyde Krenerick, A.B., 1905 Electricity; Light and Sound; Physical Chemistry	<i>Ypsilanti</i>
Helen Rose Lang, B.L., 1900 Aesthetics; German Literature; English History	<i>Indianapolis, Ind.</i>
William Arnold Ludwig, B.S., 1900 Physics; Heat; Physical Chemistry	<i>Ann Arbor</i>
Jennie Marian Liebich-Coy, A.B., 1905 German Literature; German Philology; French Literature	<i>Saginaw</i>

¹The subjects of study pursued by candidates for an advanced degree are indicated under their respective names, the subject first named being the major study.

²The names marked with an asterisk are of students who were pursuing graduate work in the Summer Session, but who were not regularly matriculated in the University.

- *George Edward McCord, A.B., *Wittenberg College*, 1901, A.M., *ibid.*, 1905 *Atchison, Kan.*
 Mathematics; Physics; Physical Chemistry
- *William Charles McDougall, A.B., *Hiram College*, 1902 *St. Thomas, Ont.*
 Margaret Parthenia Murrell, A. B., 1902 *Decatur, Ill.*
 Latin; Roman Political Institutions; English Literature
- Frances Elisabeth Nichols, A.B., *Middlebury College*, 1900, A.M., 1905 *Winona, Minn.*
- Thomas Ernest Rankin, A.B., 1898, A.M., 1905 *Emporia, Kan.*
 Rhetoric; Aesthetics; English Literature
- Rufus Clark Shellenbarger, A.B., 1903 *Yankton, S. Dak.*
 Physics; Mathematics; Physical Chemistry
- Alice Kerr Sturm, A.B., 1902 *Saline*
 Latin; English Literature; Roman Political Institutions
- Edgar Campbell Thompson, A.B., 1901 *Detroit*
- Luella Townley, A.B., 1904 *Cincinnati, O.*
 English Literature; Ethics; Aesthetics
- Louisa Amelia Van Dyke, A.B., 1904 *Indianapolis, Ind.*
 Mathematics; Physics; Pedagogy
- Mary Ross Whitman, A.B., 1904 *Beaver, Pa.*
 Latin; Ancient Philosophy; General Linguistics
- *Nellie Leila Wortman, A.B., *Olivet College*, 1901 *Ionia*
 Latin; Comparative Linguistics; Roman Political Institutions
- Oscar Herman Wurster, A.B., 1905 *Ann Arbor*
 General and Physical Chemistry; Analytical Chemistry; Mineralogy

ACADEMIC SESSION, 1905-1906

- Charlotte Zulima Aldrich, Ph.B., *Albion College*, 1896 *Holt*
 American History; European History; History of Education
- Joseph Emanuel Alexander Alexis, A.B., *Augustana College*, 1905 *Whitehall*
 Hebrew; Hellenistic Greek; Semitic History
- Frank Eugene Andrews, B.S., 1900 *Ypsilanti*
 Physics; Mathematics; Electrical Engineering
- George William Barnum, A.B., 1905 *Ann Arbor*
 American History; Constitutional Law; Political Philosophy
- Arthur Granville Beach, A.B., *Marietta College*, 1891, B.D., *Yale Divinity School*, 1896 *Ypsilanti*
- John Knight Munro Berry, A.B., 1901, A.M., 1902 *Ypsilanti*
 German Literature; Germanic Philology; General Linguistics
- William Edward Bohn, A.B., *German Wallace College*, 1899, A.M., *Ohio State University*, 1900 *Ann Arbor*
 Rhetoric; English Literature; Aesthetics
- Oswald Frederic Boucke, A.B., 1905 *Bremerhaven, Germany*
 European History; Sociology; English History

Harold Prell Breitenbach, A.B., 1901, A.M., 1903 Rhetoric; English Literature; Aesthetics	<i>Detroit</i>
John R. Brumm, A.B., 1904 Rhetoric; Sociology; Aesthetics	<i>Nashville</i>
Warren David Brush, B.S., <i>Baldwin University</i> , 1905 Botany; Zoology; Botanical Ecology	<i>Berea, O.</i>
Charles William Burrows, A.B., 1898, A.M., 1901 Physics; Mathematics; Physical Chemistry	<i>Ann Arbor</i>
Elizabeth Margaret Bush, A.B., 1905 American History; Early English Literature; English History	<i>Saginaw</i>
Orma Fitch Butler, A.B., 1897, A.M., 1901 Latin; Roman Law; Greek	<i>Ann Arbor</i>
James Andrew Campbell, A. B., 1901 German Literature; German Philology; Pedagogy	<i>Ann Arbor</i>
James Allen Canby, A.B., <i>Bethany College</i> , 1896 Ethics; History of Philosophy; Sociology	<i>Ann Arbor</i>
Herbert Watson Clark, A.B., 1905 Rhetoric; Aesthetics; English History	<i>Las Vegas, New Mex.</i>
Frances Elizabeth Clarke, B.L., 1900 Rhetoric; Anglo-Saxon; Aesthetics	<i>Albion, N. Y.</i>
Edward Clinton Clifford, B.S., <i>University of Maine</i> , 1904 Forest Management; Silviculture; Mensuration	<i>Woodfords, Me.</i>
Walter Francis Colby, A.B., 1901 Physics; Mathematics; Mechanics	<i>Hart</i>
Mabel Rebekah Collins, Ph.B., <i>Albion College</i> , 1897 Latin; Roman Political Institutions; German	<i>Ann Arbor</i>
Alfred Cook, A.B., <i>Northwestern University</i> , 1877, Ph.D., <i>University of Halle</i> , 1886	<i>Plano, Ill.</i>
Charles Wilford Cook, A.B., 1904 Analytical Chemistry; Mineralogy; Commerce	<i>Fenton</i>
Lotta Fayette Copley, A.B., 1905 Latin; German; English Literature	<i>Decatur</i>
Alfred Dachnowski, A.B., <i>Taylor College</i> , 1897, A.M., <i>ibid.</i> , 1900, <i>Angeline Bradford Whittier Fellow in Botany</i> Plant Physiology; Botany; Philosophy	<i>Ann Arbor</i>
Calvin Olin Davis, A.B., 1895, A.M., 1904 History of Education; Theory of Education; History of Modern Philosophy	<i>Ann Arbor</i>
Walter Wiley Davis, A.B., <i>Ohio Wesleyan University</i> , 1903 Physics; Analytical Chemistry; Mathematics	<i>Kingston, O.</i>
Grace Andrus de Laguna, A.B., <i>Cornell University</i> , 1903	<i>Tacoma, Wash.</i>
Mary den Bleyker, A.B., <i>University of Chicago</i> , 1901 Botany; Zoology; General Chemistry	<i>Kalamazoo</i>

- Willard Melvin Drake, A.B., *Bates College*,
1902 *Auburn, Me.*
Forest Management; Silviculture; Mensuration
- Winthrop Davenport Foster, A.B., *Williams College*, 1904 *Auburndale, Mass.*
Silviculture; Dendrology; Forest Management
- John Sharpless Fox, A.B., *Haverford College*,
1902, *Peter White Fellow in American History* *Ann Arbor*
American History; Political Science; Philosophy
- Earl Hazeltine Frothingham, A.B., 1904 *Chicago, Ill.*
Forest Management; Silviculture; Forest Mensuration
- Charles Edwin Galloway, A.B., 1902, *George S. Morris Fellow in Philosophy* *Fond du Lac, Wis.*
Psychology; History of Philosophy; Physiology
- Evelyn Gail Gardiner, A.B., *Vassar College*,
1904 *Detroit*
Political Economy; Government; Sociology
- Adelaide Gemberling, A.B., 1902, A.M., 1905 *Ann Arbor*
General Chemistry; Organic Chemistry; Mathematics
- Katherine Reeves George, A.B., 1903 *Ann Arbor*
English Literature; American Literature; Rhetoric
- Frances Sweet Gibson, A.B., *Albion College*,
1902 *Otsego*
Latin; German; Roman Political Antiquities
- Minnie Almira Graham, A.B., *Mount Holyoke College*, 1900 *Lockport, N. Y.*
Physical Chemistry; Analytical Chemistry; Mineralogy
- Edna Grant, A.B., *Oberlin College*, 1904 *Oberlin, O.*
Rhetoric; English Literature; Aesthetics
- Charles Leroy Harpham, A.B., 1904 *Ann Arbor*
Political Economy; Private Finance; Industrial American History
- William D. Henderson, A.B., 1903, A.M.,
1904 *Ann Arbor*
Physics; Physical Chemistry; Mathematics
- Rufus Percival Hibbard, A.B., *Williams College*, 1899, *Dexter M. Ferry Fellow in Botany* *Gloucester, Mass.*
Botany; Morphology of Algae; Zoology
- Nina Maude Houser, A.B., 1905 *Michigan City, Ind.*
Rhetoric; American History; English Literature
- Estelle Louise Hunt, A.B., 1905 *Houghton*
English Literature; Rhetoric; French
- Walter Fred Hunt, A.B., 1904, A.M., 1905 *Glendale, O.*
Mineralogy; Analytical Chemistry; Dynamical Geology
- Anna Joseph, A.B., *University of Kansas*, 1905 *Potwin, Kan.*
Oratory; Rhetoric; English
- Homer Walker Josselyn, A.B., 1905 *Detroit*
American History; English History; Political Economy
- Calvin Henry Kauffman, A.B., *Harvard University*, 1896 *Ithaca, N. Y.*
Plant Physiology; Mycology; Organic Chemistry
- Richard Ray Kirk, A.B., 1903, A.M., 1904 *Ann Arbor*
Rhetoric; English Literature; Aesthetics

- Allen Marshall Kline, A. B., 1904, A.M., 1905 *Elsie*
American History; European History; Political Science
- George Allan Lindsay, A.B., 1905 *Detroit*
Physics; Mathematics; Astronomy
- Carlos Pointon Long, A.B., 1905 *Rogersville*
Organic Chemistry; Physical Chemistry; Mineralogy
- Marea Daisy Longwell, A.B., 1901 *Paw Paw*
English Literature; German Literature; American History
- William Arnold Ludwig, B.S., 1900 *Ann Arbor*
Physics; Heat; Physical Chemistry
- Nelson Ferris Macduff, A.B., 1905 *Jackson*
Forest Management; Silviculture; Plant Physiology
- Carl Hugh McLean, A.B., 1902 *Schoolcraft*
American History; English History; Education
- Amelia Elizabeth McSweeney, A.B., 1891 *Detroit*
Latin; Greek; Philosophy
- Frank Burr Marsh, A.B., 1902 *Big Rapids*
European History; Political Institutions; Sociology
- Frank John Mellencamp, A.B., 1903 *Ypsilanti*
Physics; Mathematics; Analytical Chemistry
- Frank Benjamin Moody, A.B., *Bates College*,
1902 *New Portland, Me.*
Forest Management; Mensuration; Timber Physics
- Clarence Burton Morrill, B.L., 1900, A.M.,
1903 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Jacob Moyer, A.B.: *Greenville College*, 1901 *Spring Arbor*
Analytical Chemistry; General Chemistry; Mineralogy
- Edla Maud Niles, Ph.B., 1898 *Ann Arbor*
Latin; Roman Political Institutions; Classical Archaeology
- ✓ Mahlon Ellsworth Olsen, A.B., 1905 *Battle Creek*
Rhetoric; English Literature; Aesthetics
- Carl Safford Patton, A.B., *Oberlin College*,
1888 *Ann Arbor*
Hebrew; Hellenistic Greek; Philosophy
- Myrtie Leah Perrigo, A.B., 1905 *Allegan*
European History; American History; Sociology
- Frank Jay Phillips, A.B., 1905 *Grand Rapids*
Forest Management; Plant Physiology; Silviculture
- Clyde Edwin Pickett, A.B., *Hiram College*,
1901 *Shepherd*
Ethics; History of Philosophy; Sociology
- Thomas Ernest Rankin, A.B., 1898, A.M., 1905 *Emporia, Kan.*
Rhetoric; Aesthetics; English Literature
- Homter Elmer Robbins, A.B., 1905 *Ann Arbor*
Latin; German Literature; Roman Political Institutions
- Adolph Marius Rovelstad, A.B., *St. Olaf Col-
lege*, 1903 *Elgin, Ill.*
Latin; Greek; General Linguistics
- Alexander Grant Ruthven, B.S., *Morningside
College*, 1903 *Ruthven, Ia.*
Zoology; Physiology; Physiography
- Hideo Sakuma, *Doshisha College*, A.M., 1905 *Tango, Japan*
Finance; Political Economy; Municipal Administration
- Ernst Schmitz, A.B., 1905 *Detroit*
German; English Literature; American History

Howard Lesher Schug, A.B., 1904 German; English Literature; Latin	<i>Ann Arbor</i>
Arthur Francis Schultz, Ph.B., <i>Albion College</i> , 1894 Pedagogy; Political Economy; American History	<i>Lansing</i>
Irving Day Scott, A.B., <i>Oberlin College</i> , 1900 Mineralogy; Chemistry; Commerce	<i>Syracuse, N. Y.</i>
Margaret E. Deshler Shearer, A.B., 1905 Greek; Greek Archaeology; French Literature	<i>Ann Arbor</i>
John Frederick Shepherd, B.S., <i>Saint Lawrence University</i> , 1901 Psychology; Neurology; Philosophy	<i>Whitehall, Ill.</i>
Elisabeth Ethel Sinclair, A.B., 1904, A.M., 1905, <i>Newberry Classical Fellow</i> Greek; Greek Archaeology; Latin	<i>Port Huron</i>
Mary Louise Smith, A.B., 1905, <i>Peter White Classical Fellow</i> Latin; Roman Political Institutions; German	<i>Ann Arbor</i>
Manson Alexander Stewart, A.B., 1903, A.M., 1904 Latin; Greek; Ancient Philosophy	<i>Elba</i>
Mallory Napoleon Stickney, A.B., 1905 Forest Management; Silviculture; Dendrology	<i>Lapeer</i>
Ninosuke Tanaka, <i>Peers College (Tokyo)</i> Finance; Political Economy; International Law	<i>Tokyo, Japan</i>
Margaret Lloyd Tatlock, A.B., 1905 Aesthetics; Metaphysics; Rhetoric	<i>Ann Arbor</i>
Joseph Morris Thomas, Ph.B., 1898, A.M., 1903 Rhetoric; Logic; English Literature	<i>Ann Arbor</i>
Harry Conrad Thurnau, A.B., 1899, A. M., 1903 German Literature; Germanic Philology; English Literature	<i>Ann Arbor</i>
Ole Tonning, A.B., <i>Luther College</i> , 1904 German Literature; Germanic Philology; European History	<i>Decorah, Ia.</i>
Donald Dexter Van Slyke, A.B., 1905 Organic Chemistry; Plant Physiology; Bacteriology	<i>Geneva, N. Y.</i>
Frank Van Vliet, A.B., 1902 History of Philosophy; Metaphysics; Mathematics	<i>Ann Arbor</i>
Theodore Edward Wagner, A.B., 1905 Physics; Physical Chemistry; Astronomy	<i>Detroit</i>
Charlotte Hall Walker, A.B., 1900 Physics; Zoology; International Law	<i>Ann Arbor</i>
Ida Margaret Walz, A.B., 1905 German Literature; English Literature; European History	<i>Harrisburg, Pa.</i>
Francis W. Wetmore, B.S., <i>Knox College</i> , 1900 Forest Management; Silviculture; Spanish	<i>Oncida, Ill.</i>
George Rufus Wheeler, A.B., <i>Albion College</i> , 1905 English Literature; History; Rhetoric	<i>Shelby</i>
Wilfred Wallace White, B.S., <i>Haverford College</i> , 1900, M.S., <i>Penn College</i> , 1900 Forest Management; Silviculture; Botany	<i>Oskaloosa, Ia.</i>
Hobart Hurd Willard, A.B., 1903, A.M., 1905 Analytical Chemistry; Organic Chemistry; Physics	<i>Ann Arbor</i>

John Garrett Winter, A.B., <i>Hope College</i> , 1901, A.M., 1904, <i>Buhl Classical Fellow</i> Latin; Greek; Ancient Philosophy	<i>Holland</i>
Wallace Kirtland Wonders, A.B., 1905 Economics; Sociology; Commerce	<i>Detroit</i>
Herbert Hollingsworth Woodrow, A.B., 1904 Psychology; Neurology; Physiology	<i>Ann Arbor</i>
Loura Bayne Woodruff, A.B., 1895, A.M., 1899, <i>Buhl Classical Fellow</i> Latin; Greek Archaeology; Ancient Philosophy	<i>Ann Arbor</i>
Oscar Herman Wurster, A.B., 1905 General and Physical Chemistry; Analytical Chemistry; Mineralogy	<i>Ann Arbor</i>

The following student, enrolled in the Department of Law, is also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

Fabian Bouton Dodds, A.B., 1905 Geology; Ethics; American History	<i>Mount Pleasant</i>
----------------------------------------------------------------------	-----------------------

The following students, having completed their undergraduate course at the University at the close of the first semester, 1906, were allowed registration in the Graduate School:

Vida Lucetta Holtzman German; English Literature; Pedagogy	<i>Vernon</i>
Carrie H. Templeton English Literature; Rhetoric; American Literature	<i>Akron, Ind.</i>
George Theodore Thorward Forest Management; Forest Mensuration; Forest Utilization	<i>South Bend, Ind.</i>
Frederic Wilson Willard Organic Chemistry; Physical Chemistry; Physics	<i>Erie, Pa.</i>
Anna Wurster Latin; German Literature; Classical Archaeology	<i>Ann Arbor</i>

SUMMARY

HIGHER DEGREES CONFERRED IN 1905.

Master of Science (in Forestry).....	5
Master of Arts.....	41
Doctor of Philosophy.....	7
	<hr/>
Total	53

STUDENTS IN THE GRADUATE SCHOOL, 1905-1906.

Summer Session of 1905.....	32
Academic Session of 1905-1906.....	103
Enrolled in another Department.....	1
Completed Undergraduate Course in February, 1906	5—141
Deduct for names counted twice.....	6
	<hr/>
Total	135

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THE UNIVERSITY BULLETIN IS ISSUED BY THE UNIVERSITY OF MICHIGAN AS OFTEN AS ONCE A MONTH DURING THE UNIVERSITY YEAR.

ENTERED AS SECOND-CLASS MATTER AT THE POSTOFFICE AT ANN ARBOR, MICHIGAN.

THE BULLETIN INCLUDES THE FOLLOWING PUBLICATIONS:—

The Annual Report of the President.

The Calendar of the University.

The Annual Announcements of the Department of Literature, Science, and the Arts, the Graduate School, the Departments of Engineering, of Medicine and Surgery, and of Law, the School of Pharmacy, the Homœopathic Medical College, the College of Dental Surgery, and the Summer Session.

Other Announcements of the several departments of instruction, Reports of University officers, etc.

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Memorial

UNIVERSITY BULLETIN

NEW SERIES, VOL. VIII, NO. 5.

MARCH 1907

UNIVERSITY OF MICHIGAN

DEPARTMENT OF
LITERATURE, SCIENCE, AND THE ARTS

GRADUATE SCHOOL

Annual Announcement

FOR

1907-1908



Ann Arbor

PUBLISHED BY THE UNIVERSITY

1907

UNIVERSITY OF MICHIGAN

DEPARTMENT OF LITERATURE, SCIENCE
AND THE ARTS

Graduate School

ANNUAL ANNOUNCEMENT

FOR

1907-1908

Ann Arbor

PUBLISHED BY THE UNIVERSITY

1907

CALENDAR.

1907

- Sept. 24 **FIRST SEMESTER BEGINS IN ALL DEPARTMENTS OF THE UNIVERSITY.**
- Nov. — **Thanksgiving Recess from Tuesday till Saturday evening, in all Departments of the University.**
- Dec. 20. **(Evening) Holiday Vacation begins in all Departments.**

1908

- Jan. 7 **Exercises resumed.**
- Feb. 7 **(Evening) FIRST SEMESTER CLOSES.**
- Feb. 10 **SECOND SEMESTER BEGINS.**
- April 10 **(Evening) Recess begins, ending April 20 (evening).**
- June 18 **COMMENCEMENT.**

ADMINISTRATIVE COUNCIL.

JAMES B. ANGELL, LL.D., *President.*

MARTIN L. D'OOGHE, PH.D., LL.D., *Professor of the Greek Language and Literature.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

VICTOR C. VAUGHAN, M.D., LL.D., *Professor of Hygiene and Physiological Chemistry, and Director of the Hygienic Laboratory.*

CHARLES S. DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.*

HENRY S. CARHART, LL.D., *Professor of Physics, and Director of the Physical Laboratory.*

HENRY C. ADAMS, LL.D., *Professor of Political Economy and Finance.*

RICHARD HUDSON, LL.D., *Professor of History, and Dean of the Department of Literature, Science, and the Arts.*

ALBERT A. STANLEY, A.M., *Professor of Music.*

FRANCIS W. KELSEY, PH.D., *Professor of the Latin Language and Literature.*

OTIS C. JOHNSON, PH.D., A.M., *Professor of Qualitative Analysis.*

WARREN P. LOMBARD, A.B., M.D., *Professor of Physiology.*

JACOB REIGHARD, PH.D., *Professor of Zoology, and Director of the Zoological Laboratory and the Zoological Museum.*

THOMAS C. TRUEBLOOD, A.M., *Professor of Elocution and Oratory.*

JAMES A. CRAIG, PH.D., *Professor of Semitic Languages and Literatures and Hellenistic Greek.*

J. PLAYFAIR McMURRICH, PH.D., *Professor of Anatomy.*

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ARTHUR G. CANFIELD, A.M., *Professor of Romance Languages.*

WILLIAM H. PAYNE, LL.D., *Professor of the Science and the Art of Teaching.*

FRED N. SCOTT, PH.D., *Professor of Rhetoric.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

FREDERICK G. NOVY, Sc.D., M.D., *Professor of Bacteriology.*

EDWARD D. CAMPBELL, B.S., *Director of the Chemical Laboratory, and Professor of Chemical Engineering and Analytical Chemistry.*

ALLEN S. WHITNEY, A.B., *Professor of Education.*

FILIBERT ROTH, B.S., *Professor of Forestry.*

G. CARL HUBER, M.D., *Professor of Histology and Embryology.*

FRED M. TAYLOR, PH.D., *Professor of Political Economy and Finance.*

ALEXANDER ZIWET, C.E., *Professor of Mathematics.*

MOSES GOMBERG, Sc.D., *Professor of Organic Chemistry.*

GEORGE W. PATTERSON, JR., PH.D., *Professor of Electrical Engineering.*

FREDERICK C. NEWCOMBE, PH.D., *Professor of Botany.*

JOHN O. REED, PH.D., *Professor of Physics, and Dean of the Summer Session.*

WILLIAM J. HUSSEY, B.S., *Professor of Astronomy.*

ARTHUR FAIRBANKS, PH.D., *Professor of Greek and Greek Archaeology.*

CLAUDE H. VAN TYNE, PH.D., *Professor of American History.*

JOSEPH H. DRAKE, PH.D., LL.B., *Professor of Latin, Roman Law, and Jurisprudence.*

WILLIAM H. HOBBS, PH.D., *Professor of Geology.*

ALFRED H. LLOYD, PH.D., *Junior Professor of Philosophy.*

MORITZ LEVI, A.B., *Junior Professor of French.*

WALTER DENNISON, PH.D., *Junior Professor of Latin.*

EARL W. DOW, A.B., *Junior Professor of History.*

JOSEPH L. MARKLEY, PH.D., *Junior Professor of Mathematics.*

CHARLES H. COOLEY, PH.D., *Junior Professor of Sociology.*

GEORGE REBEC, PH.D., *Junior Professor of Philosophy.*

EDWARD D. JONES, PH.D., *Junior Professor of Commerce and Industry.*

JULIUS O. SCHLOTTERBECK, PH.D., PH.C., *Junior Professor of Pharmacognosy and Botany.*

S. LAWRENCE BIGELOW, PH.D., *Junior Professor of General and Physical Chemistry.*

WALTER B. PILLSBURY, PH.D., *Junior Professor of Philosophy.*

JOHN A. FAIRLIE, PH.D., *Junior Professor of Administrative Law.*

JOHN R. EFFINGER, PH.D., *Junior Professor of French.*

TOBIAS DIEKHOF, PH.D., *Junior Professor of German.*

LOUIS A. STRAUSS, PH.D., *Junior Professor of English.*

EDWARD H. KRAUS, PH.D., *Junior Professor of Mineralogy.*

JAMES W. GLOVER, PH.D., *Junior Professor of Mathematics and Insurance.*

Members of the Advisory Committee, Professors DENNISON, HUDSON, REED and LLOYD.

Secretary of the Administrative Council, Professor WALTER DENNISON.

ANNOUNCEMENT OF THE GRADUATE SCHOOL.

GENERAL INFORMATION.

The University of Michigan.

The University of Michigan is a part of the public educational system of the State. The governing body of the institution is a Board of Regents, elected by popular vote for terms of eight years, as provided in the Constitution of the State. In accordance with the law of the State, the University aims to complete and crown the work that is begun in the public schools, by furnishing ample facilities for liberal education in literature, science, and the arts, and for thorough professional study of engineering, medicine, law, pharmacy, and dentistry. Through the aid that has been received from the United States and from the State, it is enabled to offer its privileges, with only moderate charges, to all persons of either sex, who are qualified for admission. In the several faculties there were in 1906-1907, about 340 officers of instruction. Including the enrollment of the Summer Session, about 4,800 students, representing 50 States and Territories and 15 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts.

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1906-1907, 133 regular teachers and 27 assistants. The students in attendance numbered about 1,600, of whom about 140 were graduates. The presence of such a number of graduate students, together with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Graduate School.

The first graduate student at the University is recorded in the catalogue of 1856. The degrees of Master of Arts and of Master of Science were earliest conferred, the degree of Doctor of Philosophy being offered for the first time in 1875. Changes made in studies in 1877-1878 had an important bearing on graduate work at the University. This was due to the multiplication of electives and the introduction of the credit system. The seminary method of instruction began then to assume considerable proportions, and the movement was helped along by a growing demand for better trained teachers.

In the spring of 1892 the Graduate School was organized in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department, and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of higher work, and, so far as possible, for the separate instruction of graduate students. It lays emphasis, therefore, upon university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council which consists of the President of the University, the professors and junior professors in the Faculty of the department, and such other instructors as may be elected to membership. Application for admission to the School are made to a Secretary, who is assisted by an Advisory Committee.

ADMISSION AND REGISTRATION.

Admission.

The privileges of the Graduate School are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School. But admission to study in the School does not necessarily imply admission to candidacy for a degree. The requirements made of candidates for higher degrees may be found on pages 7 to 11.

Graduates of other institutions whose course of study is not substantially equivalent to that prescribed at this University are required to do an additional amount of undergraduate work before being admitted to registration as members of the Graduate School.

For information in regard to enrollment for graduate study in the Summer Session, see page 12.

Registration.

All applicants for admission to the Graduate School must first present themselves with their credentials to the Secretary of the Administrative Council. In case the Secretary regards their application with favor, they will receive special blanks to be filled out subject to the approval of the instructors under whom they wish to work, *and to be returned to the Secretary not later than two weeks after the opening of the semester.* All applications for admission to the Graduate School are subject finally to the action of the Administrative Council.

At the same time graduate students must report to the Dean of the Department of Literature, Science, and the Arts; and in common with all other students they must register in the office of the Secretary of the University, and pay their fees to the Treasurer.

All students of the Graduate School, *whether registered in a previous year or not*, are required to register with the Secretary of the Administrative Council at the beginning of *each year* of residence. *Such registration must be made at the beginning of the year to ensure recognition of meeting the residence requirement.*

Students who withdraw from the University during the academic year are requested to inform the Secretary without delay of such withdrawal.

Students who finish the undergraduate course of this University at the end of the first semester and who continue their residence for the remainder of the year, are permitted to register in the School and thus secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

Applicants who do not wish to become candidates for a degree, may be admitted and registered as special graduate students. Such graduate students must designate, and have approved, the general lines of study which they wish to pursue.

Changes of subjects originally selected must be reported to the Council for approval.

DEGREES.

Admission to Candidacy.

Admission to candidacy for a higher degree is granted only to Bachelors of this University or of other universities or colleges of similar standing, or to students whose preparation for graduate study is beyond all question fully equivalent to that represented by the undergraduate course of this University. Recognition of candidacy requires the approval of the Administrative Council.

Graduate study for a degree will naturally be along lines in which the candidate has had special preparation.

Except as stated below (pages 9 and 12) one year of residence study is required of all candidates for a degree. Registration should be made and subjects of study, announced as early as possible, and *this must be done immediately* at the opening of the academic year in order to ensure meeting the residence requirement.

University System.

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. The student selects a "major study" and, in general, two "minor studies," his selection being subject, however, to the approval of the Council. When the choice has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen, the one having charge of the major study being chairman. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a master's degree. It may be added also that for the master's degree the Council may, at its discretion, approve a course of study which does not confine the candidate rigorously to a major and two minor studies.

Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within two weeks after the opening of the semester*, the particular branches of study to which they wish to give special attention. The supervision of their work will then be entrusted to the proper committee.

Degrees Conferred.

The degrees conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees—M.A., M.S.

A candidate who has been admitted to study for the master's degree, may be recommended for the degree after one year of resident study at this University, provided he passes a satisfactory examination on the subjects of study approved by the Administrative

Council. A thesis may or may not be included in the requirements for the degree as the committee in charge of the student's work may determine.

The work done in residence is mainly in pursuing courses of study regularly announced, but private work is often undertaken under special direction. It is expected that one minor study be in a different department from that in which the major study is taken. The subjects of study chosen should, however, be well related.

The practice of allowing students to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate of this University who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.* Candidates for the master's degree who find it necessary thus to complete a portion of their work *in absentia* are required to petition the Administrative Council through the Secretary for such privilege, and if their petition is granted, they must keep the Secretary informed of their continued connection with the School and of the progress of their work.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

The Doctors' Degrees—Ph.D., Sc.D.

The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. This rule may be waived in the case of those who come properly accredited from a graduate school of some other university, and of those, who as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.

It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study. The candidate must also evince ability to carry on independent research. No definite term of required residence can, therefore, be specified. As a rule, three years of graduate study are necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work. Candidates who already hold the master's degree usually find it possible to prepare for the doctor's examination after two years of further study along the same lines of work pursued for the master's degree.

A student wishing to become an applicant for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

No student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research.

A candidate for a doctor's degree must choose a major study that is substantially co-extensive with some one department of instruction in the University. He must also choose two minor studies, one of which may be in the same department as the major, but which involves a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council. A portion of the work for a doctor's degree consists in pursuing regularly announced courses of instruction, but in general a large amount of time is devoted to individual study and research under the immediate supervision of the committee in charge. This is especially true in the preparation of the thesis.

The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may at their option receive the degree of Doctor of Science.

The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but its acceptance depends more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

The thesis must be completed and a good legible copy must be put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound

copy, either written or printed, must be deposited in the University library.

Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of this thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. To guarantee the printing of the thesis, he is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices approved by the responsible committee. The candidate is required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended. The thesis must be bound with cover and title-page, and the latter, in addition to the title and name of the author, must bear the following inscription: A Thesis submitted to the Faculty of the Department of Literature, Science, and the Arts of the University of Michigan for the degree of Doctor of Philosophy (or of Science). A plan of the proposed title-page of the thesis must be submitted to the Librarian of the University for his approval. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

Examinations.

The final examinations of candidates for the higher degrees are commonly held during the first two weeks in June, but the examination can usually be arranged at any time when a candidate has fulfilled all the technical requirements and has satisfied his instructors that his work has been such as to warrant an examination.

Ordinarily the examinations are oral, and in each case they are held before those comprising the special committee in charge of the candidate's work and before such others as may be present by invitation of this committee. They may be preceded by such written tests as individual instructors consider necessary.

Candidates in attendance upon regular courses in which stated examinations are held, whether during the semester or at its end, are expected to take these examinations with the classes concerned, unless definitely excused from so doing.

For the requirement concerning theses, see pages 10 and 11.

PROFESSIONAL SCHOOLS

Students who are engaged in graduate work in the Department of Literature, Science, and the Arts, may be permitted to do partial work in one of the professional schools, but such permission is granted only by special action of the Administrative Council, and the time of preparation for examination for the literary degree is thereby extended.

SUMMER SESSION.

In departments which offer graduate courses in the Summer Session, graduate students, who are regularly matriculated in the University, may carry on work which will count toward an advanced degree. Graduates of other universities or colleges of similar standing, who are competent to enroll for a higher degree, may matriculate in the University and begin graduate study in the Summer Session. For the matriculation fee, see below, page 13.

Candidates for the master's degree, if graduates of the University of Michigan, may present themselves for examination after attendance upon three Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Candidates for the master's degree, if graduates of other approved institutions, may present themselves for examination after attendance upon five Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Many teachers avail themselves of this opportunity to begin graduate work, and later return to the University to complete the requirements for a higher degree. The number of courses in the Summer Session designed especially for graduates is large and constantly increasing. In many respects the advantages afforded for advanced study are distinctly superior to those enjoyed during the academic year. These advantages are found in the smaller classes, in the freer use of the facilities of libraries, laboratories and museums, but especially in that more direct, intimate and personal contact with the professor in charge which adds so greatly to the satisfaction and efficiency of specialized work.

In addition to the courses regularly announced for graduate instruction, it should be noted that all professors giving work during the Summer Session will gladly arrange and direct the work of graduate students competent to enroll for a degree, who may desire to work along special lines for which specific courses have not been provided.

FEEES AND EXPENSES.

Matriculation Fee.—Every student before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or students shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Fee for Summer Session.—The tuition fee for the Summer Session of the Department of Literature, Science and the Arts, for graduate students who have already matriculated, is fifteen dollars regardless of the number of courses taken.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for materials and apparatus actually consumed by them. The laboratory expenses thus depend upon the student's prudence and economy. Experience has shown that in the chemical laboratory the average expenditure for all courses is about one dollar and twenty cents a week. The deposits required in advance vary with the courses taken, ranging from one to twenty dollars.

Diploma Fee.—The fee for the diploma given on receiving an advanced degree is ten dollars, and a by-law of the Board of Regents prescribes that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Holders of fellowships and of scholarships are required to pay the matriculation fee (if not already paid), the annual fees, the diploma fee, laboratory expenses, and other similar charges, the same as other students of the department in which their work lies.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann

Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

THE LIBRARIES.

The libraries of the University, comprising the General Library, the Medical Library, the Law Library, the Homœopathic Library, and the Dental Library, contained in the aggregate, June 30, 1906, 206,568 volumes and 5,000 pamphlets. One thousand four hundred and three periodicals are regularly received.

The General Library contains 163,479 volumes, 3,800 pamphlets, and 3,050 maps. It includes the following special collections: Parsons Library (political economy), 6,076 volumes; McMillan Shakespeare Library, 6,055 volumes; Goethe Library, 1,096 volumes. The Hagerman Collection and the Dorsch Library, formerly treated as special collections, have, with the approval of the donors, been merged in the general collection. Nine hundred and thirty-seven periodicals are taken by the General Library.

Within the last few years the library has been enriched by several valuable gifts. Among the more important of these that deserve special mention are the historical books, including the Stevens Facsimiles, presented by Mr. Clarence M. Burton, of Detroit; the Morris Philosophical Library, presented by Mrs. George S. Morris; the Alpheus Felch Historical Library, bequeathed by the late Governor Alpheus Felch; the Walter Library of Romance Literature, bequeathed by the late Professor Edward L. Walter; the Stearns Musical Collection, presented by Messrs. Frederick and Frederiek K. Stearns, of Detroit; the Germanic Library of the late Professor George A. Hench, presented by his mother, Mrs. Rebecca A. Hench; and the Geological Library of the late Professor Israel C. Russell, presented by his widow.

Officers and students of the University draw books from the library, subject to certain restrictions. Special privileges are granted to graduate students, and separate rooms provided for them where work is pursued with the necessary books at hand. The reading room for general use will seat 270 readers.

The library is open for consultation fourteen hours daily during the academic year, and nine hours daily during the Summer Session, and the summer vacation. On Sundays and important legal holidays the library is closed.

The Law Library, of over 23,000 volumes, is of especial value for graduate work in political science. It contains the statutes and judicial reports of every state and of the United States, and an extensive collection of treatises, text books and legal periodicals, both American and English. It is housed on the second floor of the Law Building, with an ample reading room.

THE LABORATORIES.

Physical Laboratory.

The Physical Laboratory has recently been greatly enlarged by the addition of a new lecture room and increased space for laboratory work. This enlargement permits the department to devote the smaller rooms to advanced and graduate work. Hereafter work in electrochemistry, sound and light, heat, and electrical measurements will be conducted in separate suites of rooms, and special provision will be made for graduate students. In fact important researches for graduate theses will have separate rooms set aside for their accommodation. The apparatus for the advanced courses is already extensive, and additions are made every year to meet the needs of graduate students.

Chemical Laboratory.

The Chemical Laboratory has a floor space of over fifty thousand square feet. About fifty courses are offered during the college year, most of which involve laboratory work. The building contains a reading room in which are shelved the most frequently required reference books and a few duplicate sets of chemical journals. The main portion of the Chemical Library is readily accessible in the adjacent library building, and is especially valuable to the research student because of its complete sets of forty-nine journals devoted wholly or in large degree to Chemistry.

In addition to a full supply of routine materials and apparatus for work in General, Analytical, Organic, Physical, Pharmaceutical and Technological Chemistry, facilities are offered for advanced study and research along many lines, including apparatus for the preparation of raw materials; a continuous extraction apparatus, a hydraulic press capable of exerting a pressure of five thousand pounds per square inch, a filter press and a power-driven centrifugal machine. Direct current is available at various voltages from storage batteries, rotary transformers, and a 220-volt power plant for electrochemical or electrothermal work. Advanced students have also at their disposal various types of resistance, resistor and arc furnaces, as well as oil and gas fired furnaces for high temperature work, and both electrical and optical pyrometers. Special facilities are provided for the preparation of microscopic or photomicrographic examination of specimens either in thick polished section by vertical illumination or in thin section by either plane or polarized light. Five ventilated dark rooms provide for spectroscopic, photometric, and photographic work and experiments in refraction. Sixty analytical balances are distributed in four balance rooms and in private laboratories, and others for heavier loads or of greater delicacy are reserved for special purposes.

Mineralogical Laboratory.

This laboratory occupies ten rooms in the basement of Tappan Hall and has a total area of over 6,000 square feet. One large room is used for general laboratory purposes, another is devoted to blow-pipe methods and chemical crystallography, while a third room is used for physical crystallography and crystal drawing. Another large room contains the mineralogical collections. There is also a well appointed lecture room directly in connection with the laboratory and mineral collections. Of the other rooms mention may be made of four small dark rooms for goniometric and optical investigations. The general laboratory is well equipped with crystal models, natural crystals, and working collections for the rapid determination of minerals, principally by means of the physical properties. It is also equipped with goniometers and polarization microscopes, and other optical instruments necessary for the thorough study of crystals. The blowpipe laboratory possesses ample facilities for the carrying on of blowpipe tests, both upon plaster tablets and charcoal, as well as all other chemical reactions useful in the determination of minerals. The mineralogical collections include the Lederer, Garringer, and Rominger collections, which contain more than 30,000 specimens.

The facilities of the laboratory are such that, aside from the general courses, special attention is given to graduate and research work along the line of crystal measurements and chemical crystallography.

Geological Laboratory.

The Geological Laboratory of the University has been fitted up especially as a geographic laboratory, the Israel C. Russell Seminary Room. This room contains what was the private library of Professor Russell with the important geological and geographical journals and Geological Survey Reports continued. It is also supplied with wall maps, geographical models, topographical and geological atlases, and special maps. In an adjoining room are display and working sets of minerals, rocks, and fossils. The Russell Room is supplied with a projecting lantern and the advanced classes of the department meet in this room. Advanced students are supplied with private lock drawers and regular sittings at the reading tables. Photographic apparatus and dark room, and microscopes, also form a part of the equipment of the laboratory.

The Astronomical Observatory.

The University Observatory was founded through the liberality of citizens of Detroit, and on this account it is known as the Detroit Observatory. It is situated on the northeastern border of Ann Arbor, about half a mile from the Campus. Its principal instruments are a refracting telescope of twelve inches aperture and a large meridian circle, presented by the late Henry N. Walker of Detroit. It has also

a six-inch equatorial telescope, a comet seeker, a zenith telescope, sidereal and mean time clocks, chronograph, theodolites, etc. The larger instruments are intended primarily for research, and will be available to that end for such students as have the technical ability to use them to advantage. A shop has been established on the grounds for the repair and construction of instruments, and alterations and additions are now in progress which will add materially to the effectiveness of the equipment, both for instruction and research. The optical parts of a reflecting telescope of thirty-six inches aperture have been ordered and the construction of the instrument will soon be under way. This telescope is being designed especially for photographic and spectroscopic work. The Department possesses a large technical library, and is in receipt of the publications of the leading observatories of the world.

Zoological Laboratory.

The Zoological Laboratory of twenty rooms occupies the second and third stories of the south wing of University Hall. In addition to rooms for general class and laboratory work, there are private rooms for members of the teaching staff and for assistants and research students. Each of these rooms accommodates from one to three persons and research students may thus work free from the disturbances incident to a large laboratory. All rooms are provided with gas, electricity and running water and are fitted with special tables.

In addition to the usual apparatus (microscopes, microtomes, imbedding and reconstructing apparatus) graduate students will find an ample supply of glassware and chemicals and of the minor laboratory conveniences. All these are systematically arranged and catalogued and are made freely accessible, so that the research worker is saved unnecessary delay.

A photographic room and dark room are a part of the laboratory. They are equipped for all classes of scientific photography, by means of either vertical or horizontal camera, with or without the microscope. There is also apparatus for outdoor photography.

A good working library of the more important zoological journals in all languages, as well as of separate publications, is shelved in a separate room in the laboratory. In addition much zoological literature is to be found in the General Library and in the library of the Medical Department. A set of the zoological cards of the Concilium Bibliographicum since its foundation is most conveniently arranged and kept sorted up to date in the General Library.

A special effort is made to facilitate the study of living animals. For this purpose there is a small vivarium fitted with cases suitable for terrestrial and amphibious animals. There are sixteen large, glass and slate aquaria, one of them seven feet long. There are arrangements for maintaining thirty still smaller aquaria with running water for the study of developmental stages and isolated forms.

For field work there is a good equipment of collecting apparatus in sets for individual use and a supply of the larger apparatus for joint use.

Botanical Laboratory.

The Botanical Laboratory is well equipped for advanced students for the study of morphology, physiology, and ecology. Means are at hand for embedding in paraffin and collodin, for microtome sectioning, and for staining. Culture media and apparatus, sterilizing ovens and cabinets with adequate collections and literature, offer means for research with bacteria and fungi. Chemical and physiological apparatus, klinostats, centrifuges, constant temperature rooms, dark-rooms, aquaria, and plant houses afford facilities for research in physiology. The University Botanic Garden affords ample space for outdoor culture. The location of the University gives easy and immediate access to a varied flora of a diversified topography, including the plains of the old Lake Erie bottom, and the hills, valleys, bogs, lakes, and rivers of the terminal moraine of the glacial drift.

Forestry Laboratory.

In the Forestry Laboratory students receive instruction in forest botany, timber physics, structure of woods, and certain features of wood technology, as well as in forest measurements and the methods of study of the growth of timber. A good collection of wood specimens, sections of trees, and herbarium material is provided and will be increased as rapidly as possible. There is an ample supply of microscopes, compasses, calipers, height measures, and other apparatus for use in the laboratory and in the field.

Special facilities for the study of forestry are supplied by the Saginaw Forest Farm, a tract of land about one mile west of the city of Ann Arbor, presented to the University by the Honorable Arthur Hill, of Saginaw.

The farm, comprising eighty acres, is to serve as an object lesson in forestry. Upon it provision is to be made for (1) an arboretum of all useful forest trees that can grow in Michigan; (2) demonstrative areas for seed-bed and nursery work; (3) model plantations of forest trees; and (4) special experiments in forestry, relating to various methods of propagating different kinds of timber, to the raising of particular forest products, and to other practical purposes.

Psychological Laboratory.

The Psychological Laboratory occupies fourteen rooms, including two dark-rooms. All are connected by wires with a central switchboard, and can be supplied with low potential currents from a central plant and connected in pairs for chronometric work. Power is provided by electric motors.

The apparatus includes all the more important standard instru-

ments and many specially devised for researches that have been carried on in the laboratory. The equipment for work in sound and for studying the relations between the psychological processes and mental states is particularly large, but every field is represented. Among the instruments may be mentioned kymographs by Zimmermann, Hipp chromoscopes, the ton variator of Stern with the Whipple gasometer bellows, a complete set of Verdin's instruments for investigating speech, forks of König and Edelmann, and a modified Wien apparatus by Kohl for determination of sound intensities.

Special apparatus for research work will be procured, or constructed, as may be desired by individual students doing advanced work.

Statistical Laboratory.

This laboratory is equipped with various instruments to facilitate the computation and tabulation of statistics. Students are instructed in the preparation and tabulation of premiums, reserves, and other schedules required in the practical work of insurance offices and statistical bureaus. The laboratory also contains a working library comprising most of the important actuarial journals and text books on actuarial theory.

THE MUSEUMS AND OTHER COLLECTIONS.

University Museum.

The University Museum contains collections illustrative of geology (the mineral collection, for convenience of instruction in mineralogy, being care for in Tappan Hall), of zoology, and of anthropology. Special collections in botany, materia medica, chemistry, anatomy, and the industrial arts are deposited in the various buildings devoted to the subjects they illustrate. All of these are accessible to students.

The following descriptions indicate the character of some of the collections included in the University Museum.

I. THE GEOLOGICAL COLLECTIONS consist of:—

a. The large series of lithological and palæontological specimens brought together by the State geological survey, of which over a hundred fossil species have become the types of original descriptions.

b. The White Collection, consisting of 1,018 distinct entries, 6,000 specimens, of invertebrate fossils.

c. The Rominger Collection, embracing about 5,000 species of invertebrate fossils, represented by at least 25,000 specimens.

d. Smithsonian Deposits, consisting, for the present, of a collection of specimens of foreign and domestic building stones, and specimens of fossils from the Upper Missouri.

e. Miscellaneous Donations, Collections, and Purchases, includ-

ing a series illustrative of the metalliferous regions of the Upper Peninsula, collected by the late Professor Alexander Winchell; an interesting collection of fossils, chiefly Cretaceous, from the Yellowstone Valley, presented by the late General Custer, U. S. A.; and a series of six to eight hundred rock species and varieties from the Drift of Ann Arbor, collected, dressed to standard size and form, and presented by the late Miss Eliza J. Patterson. A collection of 150 specimens of ores and rocks has recently been presented by the United States National Museum.

The entire collection, the larger portion of which consists of invertebrate fossils, is estimated to contain approximately 17,000 entries and about 60,000 specimens.

II. THE ZOOLOGICAL COLLECTIONS are large. They include a collection of animals of the Pacific Coast made by Lieutenant Trowbridge, and many valuable specimens collected in the Philippine Islands by Dr. Joseph B. Steere.

The Bird Collection includes about 4,500 skins and 1,600 mounted specimens. The collection of Alcoholic Material includes a series of invertebrate types, as well as many interesting vertebrates and a considerable number of anatomical preparations. It is stored in a darkened room. The Mollusk Collection includes the shells of nearly 6,000 species, representing most of the genera of land, fresh-water, and marine mollusks. They are thoroughly classified and arranged according to the latest authorities, making the collection of special value to the student. The Coral Collection includes a large number of species, mostly from Formosa and the Philippines.

III. THE ANTHROPOLOGICAL COLLECTIONS. Among the most notable features of this department of the Museum are:—

a. The Oriental Section, including the entire Chinese Collection, which the Chinese Government sent to the New Orleans Exposition in 1885.

b. The Stearns Collection of musical instruments, comprising over 1,400 typical instruments of all nations—ancient and modern, civilized and savage—illustrating the history of music and the progress of musical art.

c. The collection of Peruvian and New Mexican ceramics, including an exceptionally fine series of ancient Peruvian burial pottery and modern basins secured by the Beal-Steere Expedition, and an extensive series of New Mexican pottery received from the Smithsonian Institution.

d. The modern Indian section, including wearing apparel, implements of war and the chase, and household utensils of the South American, North American, and the Alaskan Indians, and a fine example of the Alaskan totemic column.

e. The Stone Age section, including the local collection of the late David De Pue, a series of Danish implements, and a series of casts of rare implements prepared by the Smithsonian Institution.

Museum of the Fine Arts and History.

The works of art belonging to the University are on exhibition in the galleries provided for them in the library building. A printed catalogue, prepared by Professor Martin L. D'Ooge, contains fuller descriptions than can here be given. The collection was begun in 1855. It contains a gallery of casts, in full size and in reduction, of some of the most valuable ancient statues and busts, such as the Hermes of Praxiteles, the Apollo Belvedere, the Laocoon, and the Sophocles; casts of the sculptural decorations from the arch of Trajan at Benevento, presented by the class of 1896; more than two hundred reductions and models in terra cotta and other materials; the statue of Nydia by Randolph Rogers; casts of modern statues, busts, etc., and reliefs; a number of engravings and photographic views, illustrating especially the architectural and sculptural remains of Ancient Italy and Greece; a small collection of engraved copies of the great masterpieces of modern painting; two series of historical medallions—the HORACE WHITE COLLECTION and the GOVERNOR BAGLEY COLLECTION—the former illustrative of ancient, mediæval, and modern European history, the latter designed to embrace the commemorative medals struck by order of Congress or other authorities, and now containing one hundred such medals; and a large collection of coins, chiefly Greek and Roman, presented to the University by the late Dr. Abraham E. Richards.

THE ROGERS GALLERY comprises the entire collection of the original casts of the works of the late Randolph Rogers, more than a hundred in number. It was given by that distinguished sculptor to the State of Michigan for the University museum.

THE LEWIS GALLERY, bequeathed to the University by the late Henry C. Lewis, of Coldwater, comprises about four hundred and fifty paintings and forty pieces of statuary.

THE DE CRISCIO COLLECTION OF LATIN INSCRIPTIONS, about 260 in number, ranging in age from the reign of Augustus to the 5th century, A. D. Most of the inscriptions are on slabs of marble. This collection was acquired in 1899 through the generosity of Mr. Henry P. Glover, of Ypsilanti.

The late J. Q. Adams Fritchey, A.M., of St. Louis, Mo., a graduate in the Class of 1858, bequeathed to the University a collection of modern coins, medals, and medallions, numbering about one thousand, issued prior to 1876, and possessing historic value and interest to numismatics.

Dr. Henry Smith Jewett (A.B., 1868), of Dayton, Ohio, has recently presented to the University a complete set of the various issues of fractional currency issued by the United States government during the Civil War and Reconstruction periods. Accompanying this collection is a nearly complete set of the "documentary" stamps issued by the government during the Civil War.

Special Collections and Museums.

THE BOTANICAL COLLECTION is shelved in the Botanical Laboratory, and contains, in addition to Michigan plants collected by the public surveys, several valuable herbaria and sets of plants that have been presented to the University from time to time. Among these some of the most important are the HOUGHTON HERBARIUM, the SAGER HERBARIUM, the AMES HERBARIUM, the HARRINGTON COLLECTION, the BEAL-STEERE BOTANICAL COLLECTION, the ADAMS-JEWETT COLLECTION, and the GARRIGUES COLLECTION.

The collections in PHARMACOGNOSY and INDUSTRIAL CHEMISTRY occupy a floor space of 2,500 square feet in the chemical building. The Pharmacognosy Collection comprises several thousand mounted and labeled specimens of products from all parts of the world, such as are used for medicinal, alimentary, and industrial purposes. The cultivation and preparation for the market and the commerce of these articles among the peoples of the earth, are illustrated by collections of authentic photographs, many of which have been expressly procured for the study of commerce with distant parts of the world.

The collection in Industrial Chemistry illustrates the natural resources and chief manufactures of Michigan, and of various parts of the world. Crude materials, raw and unfinished products, as well as completed articles of commerce in their several grades are displayed, together with models and plans of production by modern methods.

SOCIETIES.

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc. These societies are the following:

The Philological Association, the Classical Journal Club, the Romance Journal Club, Cercle Français, the Germanic Journal Club, University Oratorical Association, the Political Science Club, the Philosophical Society, the Mathematical Society, the Physical Colloquium, the Chemical Colloquium, the Zoological Journal Club, and the Botanical Journal Club.

FELLOWSHIPS.

Elisha Jones Classical Fellowship.

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President Angell, and Professors D'Ooge, Kelsey and Hudson. The period of incumbency is limited to two academic years, and must be spent at this University unless at any time the examining board shall see fit to allow the second year to be spent at some other place favorable to classical study.

No income has been available for the current year.

Newberry Classical Fellowship.

Mrs. Helen H. Newberry, of Detroit, who gave the sum of three hundred dollars in 1904 for the maintenance of a Fellowship in the classics, continued the Fellowship for 1906-1907. The holder of the Fellowship for the year was Orma Fitch Butler, A.M.

Buhl Classical Fellowship.

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1906-1907. The joint holders of the Fellowship for the year were Adolph Marius Rovelstad, A.M., and Dale Livingstone, A.M.

Peter White Classical Fellowship.

Provision for a Classical Fellowship, with an income of three hundred dollars, was continued for the year 1906-1907 by the Honorable Peter White, of Marquette. No assignment was made of this Fellowship for the year.

Peter White Fellowship in American History.

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1906-1907 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was Allen Marshall Kline, A.M.

The George S. Morris Fellowship in Philosophy.

The sum of four hundred and fifty dollars was again received from Mrs. George S. Morris for the support of a Fellowship or Scholarships to be known as the George S. Morris Fellowship or Scholarships in Philosophy, in honor of George S. Morris, Professor of Modern Languages and Literature from 1870 to 1879, and of Philosophy from 1881 to 1889, and for the purchase of books for the Morris Philosophical Library. Fifty dollars were devoted to the latter purpose, and two Scholarships of two hundred dollars each were awarded, for the year 1906-1907, to Frank Van Vliet, A.B., and Lucius Walter Elder, A.B.

Mrs. Morris will make a similar gift for 1907-1908, and the amount will be divided, or not, at the discretion of the instructors in Philosophy. Applications should be sent in before May 1, and should be accompanied by the fullest credentials.

Fellowship in Chemistry.

The sum of five hundred dollars was given by Messrs Parke, Davis and Company, of Detroit, for the continuation in the year 1906-1907 of the Fellowship in Chemistry established by them in 1895. The holder of the Fellowship for the year was George Byron Roth, A.B.

Stearns Fellowship.

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns and Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars. The holder of the Fellowship for 1906-1907 was Lewis Eugene Warren, Ph.C.

Gas Engineering Fellowship.

Members of the Michigan State Gas Association subscribed the sum of six hundred dollars per annum for the support of a Fellowship in Gas Engineering. Five hundred dollars of this sum is given to the holder of the Fellowship, the remainder is expended for special apparatus and material required for research. The holder of the Fellowship for the year 1906-1907 was Frederic Edwin Park, B.S. (Ch.E.)

Rockefeller Fellowship.

The Rockefeller Institute for Medical Research has continued its grant for a Fellowship in Hygiene and Bacteriology for the year 1906-1907. The holder of this Fellowship for the year was Rudolf Ernest Knapp, B.S.

Angeline Bradford Whittier Fellowship in Botany.

This Fellowship was established by Joseph Bradford Whittier, of Saginaw, in memory of his mother. The principal sum of the endowment is four thousand dollars. The holder of this Fellowship for the year 1906-1907 was Ellen Botsford Bach, A.M.

Dexter M. Ferry Fellowship in Botany.

Provisions for a Fellowship in Botany, with an income of five hundred dollars, was continued for the year 1906-1907 by Dexter M. Ferry, of Detroit. The holder of the Fellowship for the year was John Serenus Bordner, A.B.

The Charles James Hunt Fellowships.

In July, 1900, Mr. Charles James Hunt, of Detroit, a graduate of the University in the class of 1846, and wife, conveyed to the Board of Regents, in trust, the title to certain pieces of real estate, subject to Mr. Hunt's life-interest in the income to be derived therefrom, and to the life-interests of other persons named in the deed. After the termination of these life-interests "one or more Fellowships in the University of Michigan" are to be established in accordance with conditions named in the deed of trust and in accompanying documents, and are to be known as the Charles James Hunt Fellowships.

TEACHERS' APPOINTMENT COMMITTEE.

An appointment committee of the Faculty of the Department of Literature, Science, and the Arts, composed of representatives of the various departments of instruction, has been constituted for the purpose of assisting men and women who are studying, or have studied, under this Faculty, to secure positions as teachers. This service is performed gratuitously, in the interest of students of the University, past or present, and of superintendents of schools and boards of education wishing to employ teachers. Students who have pursued advanced work along chosen lines of study naturally receive special consideration. Persons desiring to reach this committee should address their communications to the Secretary of the Appointment Committee.

MUSICAL ADVANTAGES.

Graduate students interested in music have in Ann Arbor exceptional advantages, whether they wish to hear good music for recreation and as a part of a liberal education, or to pursue special studies.

The theory of music may be studied under the direction of the Professor of Music in the University, who offers several courses;

applied music may be taken in the University School of Music, which furnishes instruction of University grade in Piano, Voice, Violin and Organ.

In the course of the year there are many concerts, the prices of which are fixed at cost in order to make it possible for all students to hear them. A series of ten is given by the Choral Union, a University organization maintaining a chorus of three hundred members (chiefly students), five concerts being grouped in the May Festival, at which works of the first rank are presented with full chorus and orchestra. Another series of ten concerts is given by the Faculty of the University School of Music. A third series, consisting of historical piano recitals, is given by the head of the pianoforte department in the University School of Music. There are in addition many other concerts and recitals every season.

Students who have had an adequate preliminary training may take music as either a major or a minor in connection with other graduate studies.

The University is so fortunate as to possess the great organ which was built for the Columbian Exposition, in 1893. After the Exposition this was brought to Ann Arbor and set up in University Hall as a memorial of Henry S. Frieze, who was professor of Latin in the University from 1854 to 1889.

In the University Museum is the Stearns Collection of Musical Instruments, presented by Mr. Frederick Stearns of Detroit. This collection is available for special study to students who are competent to work upon the difficult problems for the solution of which they furnish material.

Courses of Instruction.

ACADEMIC SESSION.

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates. For further information reference may be made directly to the head of the department concerned.

A more complete statement of the appointments and resources of the University will be found in the University Calendar, and fuller information regarding the courses of instruction, their times and places of meeting is given in the Annual Announcement of the Department of Literature, Science, and the Arts. In some cases special departmental announcements are issued. All these publications will be furnished without charge on application to James H. Wade, Secretary of the University.

Inquiries concerning admission to the Graduate School and its courses of study should be addressed to Professor Walter Dennison, Secretary of the Administrative Council.

GREEK.

The courses here announced presuppose, in general, four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Xenophon, Lysias, Homer, Thucydides, the Tragic Poets, and Aristophanes.

Professor D'Ooge:—

Teachers' Course.

Lectures on Greek Grammar; particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week, first semester.*

The Bucolic Poets.

The Idyls of Theocritus, Bion, and Moschus.—*Two hours a week, first semester.*

[Lucian.

Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week, first semester.*

Omitted in 1907-1908; to be given in 1908-1909.]

Seminary in Tragedy.

The Oresteian Trilogy of Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet.—*Three hours a week, first semester.*

[Studies in Euripides, with special reference to the dramatic art of the poet, his use of meters, and the antiquities of the Greek stage.—*Three hours a week, first semester.*

Omitted in 1907-1908; to be given in 1908-1909.]

Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week, second semester.*

[Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.—*Three hours a week, second semester.*

Omitted in 1907-1908; to be given in 1908-1909.]

Modern Greek.

Practical introduction and practice in reading specimens of modern Greek literature.—*Two hours a week, second semester.*

[Pausanias and the Topography and Monuments of Ancient Athens.

Two hours a week, second semester.

Omitted in 1907-1908; to be given in 1908-1909].

Professor FAIRBANKS:—

History of Greek Art from the Beginning to the Roman Period.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Greek Philosophy.

In 1907-1908 the work will be based on Plato's Republic. The course is intended for students of Philosophy as well as for students of Greek.—*Two hours a week with an additional hour at the pleasure of the instructor, first semester.*

Greek Prose Composition.

This course is intended for those who are preparing to teach Greek.—*Two hours a week, second semester.*

Greek Mythology and Religion.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

[Aristophanes.

Several plays will be read, with selections from the remainder. Studies in the development of comedy, in the dramatic structure of the plays, and in the social and political influence of Aristophanes accompany the reading.—*Three hours a week, second semester.*

Omitted in 1907-1908; to be given in 1908-1909].

Studies in Greek Antiquities.

In 1907-1908 judicial and political antiquities will be studied, with special reference to Aristotle's Athenian Constitution.—*Two hours a week, second semester.*

Assistant Professor SANDERS:—

Greek Epigraphy.

A study of the local alphabets, and exercises in reading inscriptions.—*Two hours a week, first semester.*

Greek Palæography.

Two hours a week, second semester.

Journal Club.

Analysis and criticism of important articles in the domain of the Latin and Greek languages and literatures, Latin and Greek grammar and lexicography, Greek and Roman history, archaeology and antiquities by members of the classical faculty and members of the Latin and Greek seminaries.

LATIN.

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the University collection of classical antiquities and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museums of Rome and Naples.

4. Casts of Ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 300 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmaeler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Professor KELSEY:—

Latin Seminary: Greek Philosophy at Rome: Lucretius.

Open to graduate students only.—*Two hours a week, throughout the year.*

Lucretius.

Interpretations and lectures.—*Two hours a week, first semesters.*

The Topography and Monuments of the City of Rome.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Roman Art, as studied in the Monuments.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Professors KELSEY and DENNISON:—

Cæsar's Gallic War (Teachers' Course, A).

Lectures. Papers prepared by those taking this course. Critical study of the text of the Gallic War, on the basis of Meusel's edition, Studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical studies of the Bucolics, and selected portions of the Georgics, Aeneid, and Appendix Vergiliana, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DRAKE:—**Roman Literature.**

Interpretations of selections from representative authors, from Ennius to Boethius; lectures.—*Four hours a week, first semester.*

General Course in Roman Literature.

Lectures and Topical Studies. This course is designed for students interested in the general subject of literature. No knowledge of Latin is required. The Roman literature will be treated in its broad relations to the Greek literature and to modern literature.—*Two hours a week, first semester.*

Professor DRAKE and Assistant Professor MEADER:—**Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.**

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Professor DENNISON:—**[Latin Inscriptions.**

Reading of inscriptions of different periods from the De Criccio collection and from reproductions. Interpretations of selected inscriptions.—*Two hours a week, second semester.*

This course will be omitted in 1907-1908.]

Martial; Petronius, Trimalchio's Banquet.

With special reference to the private and social life of the Romans.—*Two hours a week, first semester.*

[The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century.—*Two hours a week, second semester.*

This course will be omitted in 1907-1908.]

The Letters of Cicero.

Interpretation of selected letters, with special reference to Roman manners and political conditions at the end of the Republic.—*Two hours a week, second semester.*

[The Private Life of the Romans.

See Courses in CLASSICAL ART and ARCHAEOLOGY.

This course will be omitted in 1907-1908.]

Professor DENNISON, Assistant Professors SANDERS and MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

[The Sources of the Roman Historians.

Lectures with direction of work on special themes.—*One hour a week, first semester.*

This course will be omitted in 1907-1908.]

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Assistant Professors SANDERS and MEADER:—

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Assistant Professor MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

[The Pseudo-Cæsarian *Bellum Africanum* and *Bellum Hispaniense*.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1907-1908.]

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

CLASSICAL ART AND ARCHÆOLOGY.

The following courses do not require a knowledge of Greek or of Latin. The large collection of lantern slides and photographs owned by the University makes it possible to illustrate all these courses fully. The collection of casts of ancient sculpture in the Art Gallery is also utilized in the courses in ancient art. A more complete statement of the material at hand for the study of Roman Archaeology is given under the department of Latin.

Professor D'OUGE:—

Ancient Athenian Life.

Lectures illustrated by means of stereopticon slides.—*Two hours a week, second semester.*

Professor KELSEY:—

Roman Art as Studied in the Monuments:

Introduction to Roman Archæology; Elements of Roman Architecture; sculpture, painting and the minor arts in the Roman period. Lectures, illustrated with the stereopticon.—*Three hours a week, second semester.*

[The Topography and Monuments of the City of Rome.

Lectures, illustrated.—*Three hours a week, second semester.*
Omitted in 1907-1908.]

Professor FAIRBANKS:—

History of Greek Art from the Beginning to the Roman Period.

Lectures and assigned readings on Greek Architecture, Sculpture, Vase-painting, and the minor arts. The course is illustrated with the stereopticon, and occasional lectures are given in the Art Gallery.—*Three hours a week, first semester.*

Greek and Roman Mythology; Greek Religion.

Illustrated lectures and assigned readings. The treatment of classical myths will have special reference to their influence on modern literature.—*Two hours a week, second semester.*

[Professor DENNISON:—

The Private Life of the Romans.

Lectures on Roman life, with a study of the social conditions of antiquity. Illustrated with the stereopticon.—*One hour a week, first semester.*

This course will be omitted in 1907-1908.]

ROMAN LAW AND JURISPRUDENCE.

Professor DRAKE:—

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and of the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparison.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law as given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, first semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

The Science of Jurisprudence.

A study of the fundamental principles of positive law.—*Two hours a week, second semester.*

SANSKRIT.

The graduate work in Sanskrit is arranged with special reference to the needs of two classes of students: (1) Those who desire to obtain a general acquaintance with the structure of the language on account of the light which the comparative study of Sanskrit throws upon the sounds, inflection and syntax of the ancient and modern languages of Europe. By such students it may be advantageously taken either as a minor subject or as a part of their major study. Such students will use texts printed in Roman characters and thus be required to waste no time in the mastery of a difficult oriental alphabet. (2) Those who wish to obtain a fuller mastery of the language and literature as a preparation for (a) the teaching either of Sanskrit or of General Linguistics and Comparative Philology, for (b) the study of Religion and Comparative Literature, for (c) missionary or other activities in India, of which Sanskrit is the sacred language, spoken by all brahmans.

No announcement of courses of instruction is here made, since the work will in most cases require adjustment to the needs of the individual students.

The work in Sanskrit is conducted by Assistant Professor MEADER.

GENERAL LINGUISTICS AND COMPARATIVE PHILOLOGY.

The courses announced below are designed for students of both ancient and modern languages. They aim to familiarize the students with the general principles and methods of the Science of Language, to present the most important facts in the life and growth of language, and to offer an opportunity and direction in original investigations.

Assistant Professor MEADER:—

GENERAL COURSES.

Designed for those who study the subject as a collateral to work in special languages.

Principles of Linguistic Science.

The aim of the course will be to familiarize the student with the general principles and the more important problems of linguistic science. Among the topics discussed are: the relation of the Science of Language to the other humanistic sciences and to the natural sciences; Psychology and the Science of Language; the processes of word-formation and development and loss of influence; development of syntactical forms; causes and manner of changes in meaning; representative types of language structure, various bases of classification; theories concerning the origin of language.—*Two hours a week, first semester.*

Comparative Philology.

The aim of the course will be the study of the origin and development of the sounds, inflections and syntactical forms of the Indo-European languages. The course will deal with the methods and principles of comparative philology, the chief characteristics of the Indo-European languages, their relationships and classification, the sounds and inflections of the Greek, Latin (French) and Germanic languages, accent and vowel gradation (Ablaut), analogy, comparative syntax, bibliography of comparative philology. Lectures and recitations.—*Two hours a week, second semester.*

SPECIAL COURSES.

No courses can here be described in detail as they must vary with the needs of the students. In general they will be directed toward the intensive study of special problems in the fields of phonology, morphology and semantics (Science of Meanings).

SEMITICS AND HELLENISTIC GREEK.

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of the classical and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy; (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

Professor CRAIG and Dr. FRENCH :—

HEBREW.*

Genesis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

Historical Literature: Judges and I and II Samuel.

Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

Prophetic Literature:

Amos, Hosea, and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

ASSYRIAN.

Introduction to Easy Historical Inscriptions.

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's Assyrische Lesestücke, vierte Auflage.—*Three hours a week, first semester.*

Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Three hours a week, second semester.*

Babylonian Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

Religious Literature.

King's "The Prayers of the Lifting-up of the hand." Craig's "Religious Texts."—*Two hours a week, second semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

HISTORY AND ARCHÆOLOGY.

Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

Lectures on the History of Israel and Judah.

From earliest times to the Reformation of Ezra.

Lectures. Introduction to the Study of the Old Testament.

Lectures. Study of the Prophetic Books of the Old Testament.

Lectures. The Religion of the Semites.

Lectures. The Wisdom Literature of the Jews and comparison with similar productions by other peoples.

ARABIC.

Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünow's Chrestomathy.—*Two hours a week, second semester.*

Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

ARAMAIC, SYRIAC, ETHIOPIC.

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

HELLENISTIC GREEK.

New Testament.

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testa-

ment, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

Septuagint.

ROMANCE LANGUAGES AND LITERATURE.

FRENCH.

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1906-1907.

Professor CANFIELD:—

Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Three hours a week, throughout the year.*

[The History of the Novel in France.

This course will trace the growth of the novel as a form of literature and its various transformations. A number of representative masterpieces of different periods will be read, and both their technical qualities and their relation to the social and intellectual environments of the time will be studied. Particular attention will be given to the preparation and development of the movement of realism in the nineteenth century. Open to graduates and undergraduates.—*Three hours a week, throughout the year.*

Omitted in 1907-1908.]

Seminary in French Literature.

The early works of Victor Hugo. Various questions with regard to the sources, structure, style, etc., of these works will be examined.—*Two hours a week, throughout the year.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth, and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor EFFINGER:—

The Dramatic Literature of the Eighteenth and Nineteenth Centuries.

The Drama of the Revolution; the Melodramatic Period; the Romantic Movement; the Modern Drama. Lectures, reading, and reports.—*Two hours a week, throughout the year.*

Montaigne.

A careful study of the *Essais*.—*Two hours a week, first semester.*

Assistant Professor THIEME:—

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

Dr. HAMILTON:—

Introduction to the Literature of the Old French period, reading of Old French texts.—*Two hours a week, first semester.*

PROVENÇAL.

Dr. HAMILTON:—

Outline of the Grammar, with readings in Appel's *Provençalische Chrestomathie*. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN.

The minimum requirement for admission to the courses announced below consists of courses 1 and 2 described in the University Calendar for 1906-1907, or an equivalent.

Professor LEVI:—

Dante: *La Vita Nuova* and *La Divina Commedia*.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH.

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, described in the University Calendar for 1906-1907, or an equivalent.

Dr. WAGNER:—

Don Quixote.

In this course the masterpiece of Cervantes will be critically read and the manifold aspects of its significance studied.—*Two hours a week, second semester.*

Lope de Vega and the Classical Drama.

Representative masterpieces of the drama of the seventeenth century will be read and interpreted.—*Two hours a week, second semester.*

Outline of the History of Spanish Literature.

Lectures intended to accompany the foregoing courses and to offer such a view of the more important movements in Spanish literature that the works studied in them may be seen in their proper historical perspective.—*One hour a week, throughout the year.*

GERMANIC LANGUAGES AND LITERATURE.

GERMAN.

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 9a, 10 and 10a, and options in 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8, as described in the University Calendar for 1906-1907, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed

and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Proseminary in Schiller.

A comprehensive study of Schiller's life and works with special emphasis upon his philosophical speculations and their influence upon his poetical activity. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Teachers' Courses.

(a) Selected dramas of Schiller, Lessing and Goethe. Lectures, discussions and reports.—*Two hours a week, throughout the year.*

(b) Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

JOURNAL CLUB:—

Current Literature on Germanic Philology.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year at which reports are made on the important contributions to Germanic philology and literature.

Professor DIEKHOFf:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

The Middle High German Folk-Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the folk-epic. Reading and interpretation of selections from the *Nibelungenlied*, *Gudrun*, and minor epics. Reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

Proseminary in Lessing.

A comprehensive study of the life and works of Lessing. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behaghel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1907-1908, to be given in 1908-1909.]

Assistant Professor HILDNER:—

Proseminary in the Storm and Stress Movement.

Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Schiller, Heinse, etc. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Assistant Professor BOUCKE:—

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

Proseminary in Goethe.

A critical study of the leading works of Goethe. Reports, lectures, discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the course in German literature, and gives a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Primarily for graduates.—*Two hours a week, first semester.*

[The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

Omitted in 1907-1908, to be given in 1908-1909.]

Dr. FLORER:—

Life and Works of Luther.

Lectures on Luther's influence on the development of the German written language and modern German literature. Discussions of the relation of Luther's teachings to the modern religious movement in Germany. Advanced course open to graduates and undergraduates.—*Two hours a week, first semester.*

Studies in the Development of the German Novel.

Lectures on the leading tendencies of the modern German novel with special emphasis upon the recent works of Frenssen and Rosegger. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

GOTHIC.

Professor DIEKHOF:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of Germanic Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN.

Assistant Professor BOUCKE:—

Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

PHONETICS.

Dr. EGGERT:—

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first semester.*

ENGLISH

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In cases of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The English Satirists of the Seventeenth and Eighteenth Centuries; The Romantic Revival in England at the close of the Eighteenth Century; The Pre-Shakespearian Drama in England; Shakespeare's Histories.

Assistant Professor TILLEY:—

Old English.*

A general introduction to the 'subject.—*Two hours a week, first semester.*

Old-English Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern English Grammar.

This course is intended specially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

Assistant Professor TATLOCK:—

English Literature. The Thirteenth and Fourteenth Centuries.

This course is open, without permission, to those only who take, or have taken, a course in Chaucer. It will deal mainly with preChaucerian Middle English literature, and will consist in lectures and outside reading, with the purpose of illustrating Chaucer and the Middle Ages. Mediæval literature will be classified according to its various *genres* and origins; an account will be given of twelfth century Latin literature, of the chronicles, of the origins of the Arthurian and other romantic material, of the fabliaux, the legends and the like. The course may advantageously be taken by students of any modern literature or of mediæval history.—*Two hours, first semester.*

English Literature. From Chaucer to the Renaissance.

This course consists in lectures and outside reading on Wyclif, Chaucer, Gower, Langland, Malory, Skelton, the Scottish poets of the fifteenth and sixteenth centuries, and other writers, and on the native origins of the English drama.—*Two hours, second semester.*

*The term 'Old English' is used in this Announcement for the period of English often called "Anglo-Saxon."

Professors DEMMON and STRAUSS:—

English Literature Seminary.

Each student is expected first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of widely varying types. The list of masterpieces is as follows: Moore's *Utopia*; Bacon's *Essays*; Milton's *Areopagitica*; Carlyle's *Sartor Resartus*; George Eliot's *Silas Marner*; Spenser's *Faery Queen*, Book I; Shakespeare's *Sonnets*; Milton's *Paradise Lost*; Dryden's *Absalom and Achitophel*; Pope's *Essay on Man*; Wordsworth's *Excursion*; Tennyson's *Maud*; Browning's *The Ring and the Book*; Swinburne's *Atlanta in Calydon*.—*Two hours, first semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: *A Midsummer Night's Dream*; *The Merchant of Venice*; *As You Like It*; *Twelfth Night*; *The Tempest*; *Richard III*; the two parts of *Henry IV*; *Henry V*; *Romeo and Juliet*; *Hamlet*; *Othello*; *King Lear*; *Macbeth*; *Coriolanus*.—*Two hours, second semester.*

American Literature Seminary.

Authors studied; Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctively American element by a comparative study with British authors.—*Second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*One hour, throughout the year.*

Studies in the Text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like *Hamlet*, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

The Development of the English Novel.

A study of the rise of the novel in England as an art form, with an attempt to discover the principle of its development. Lectures, discussions, and readings in the works of Lyly, Greene, Lodge, Nashe, Sidney, Bunyan, Defoe, Swift, Addison and Steele, Richardson, Fielding, Smollett, Sterne, and others.

RHETORIC

The advanced and graduate courses described below presuppose an acquaintance with the fundamental principles of rhetoric and a reasonable proficiency in the technique of prose. The study of composition, except where it is pursued with reference to the theory of teaching, is regarded as an undergraduate study.

Professor SCOTT:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

Newspaper Writing: Theory and Practice.

Intended for students who are preparing to do newspaper work. The class will prepare and publish, in the course of the semester, several issues of a daily paper.—*Two hours a week, first semester.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

Teachers' Course. Methods of Teaching English Composition and Rhetoric.

The course includes an outline of the principles of rhetoric and a discussion of the chief problems of composition teaching.—*Two hours a week, second semester.*

Seminary in Rhetoric and Criticism.

The subjects of discussion vary from year to year. Among the problems to be investigated are the following: The origins of prose; the nature and origin of the leading types of discourse; the psychology of figures of speech; the rhythm of prose; the sociological basis of the principles of usage. In 1907-08 a study is made of the origin, development and laws of the process of communication.—*Two hours a week, throughout the year.*

Assistant Professor THOMAS:—

Studies in the Theory of Style.

Analysis will be made of some of the most noted essays on style by authors representing the various points of view from which the subject has been considered. Among others, De Quincey, Spencer, Pater, and Stevenson will be taken up. This course will be conducted as a seminary.—*Two hours a week, second semester.*

Short Story Writing.

Analytic studies in the technique of the short story will be accompanied by constructive work in story writing.—*Two hours a week, second semester.*

Mr. MORRILL:—

Reviews.

The aim of this course is to furnish instruction, and give practice, in the writing of book-reviews for newspapers and magazines. A few lectures on standards of criticism and methods of reviewing will be given, and specimen reviews will be analyzed in detail.—*Two hours a week, second semester.*

ORATORY.

Professor TRUEBLOOD:—

Study of Great Orators.

Lectures on methods of public address and sources of power. Study of representative orations. Structure of the oration. Qualities of a good oration. Brief making. The preparation and delivery of speeches. Those who desire at some time to enter the debating contests should take this course.—*Two hours a week, first semester.*

Debating.

Study and application of the principles of argumentation. Preparation of briefs. Leading questions of the day studied and debated in class. The aim is to develop readiness in extempore speaking, to give freedom and ease on the platform, and to cultivate the logical processes of analysis and discrimination. All who expect to enter the debating contests or who expect to teach argumentation should take this course.—*Two hours a week, throughout the year.*

Shakespearean Reading.

Critical study of four plays, two tragedies and two comedies. Analysis of character, plot and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes presented from the platform. Public recitals twice each semester. Plays to be selected.—*Two hours a week, throughout the year.*

MUSIC.

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional, while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the largest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group, should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

FIRST GROUP.

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

SECOND GROUP.

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year...

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY.

Professor HUDSON:—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Present Problems of European Politics.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions and by the decline of the Ottoman Empire. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, the partition of Africa, and the problems raised by the weakening of Turkish power in southeastern Europe.

Seminary in Modern History.

The course given the first semester deals with the history of England from 1689 to 1815. The course given the second semester covers the period since 1815.—*Two hours a week, throughout the year.*

Professor Dow:—**Studies in Medieval and Early Modern European History.**

This work consists of courses which extend over two years, and may be elected two years in succession. Courses 9a and 10a relate primarily to the history of France. In the first semester a study is made of the feudal period; in the second, attention is directed to changes that took place in the later medieval and early modern period. Courses 9b and 10b (9b the first semester and 10b the second) treat of the period of the Renaissance and the Reformation, and consist, like the other two, of a series of logically related special studies. The aim of the work, aside from gaining an intensive knowledge of the subject, is to develop independence and skill in acquiring and presenting well-founded information. To these ends the students are occupied especially in preparing oral and written reports.—*Two hours a week, throughout the year.*

Seminary in Medieval History.

This work is devoted in part to an introduction to the historical method, with reference primarily to European history. The more fundamental questions regarding the study of history and its relations to other subjects are discussed, and special attention is given to means and methods of work, and to historical bibliography, diplomatic, and other aiding sciences. The main purpose in view, however, is to provide practice in historical investigation and writing. The students are expected to co-operate with the instructor in the study of some subject from the sources, and to take such part as they can in both critical and constructive tasks.—*Two hours a week, throughout the year.*

Assistant Professor Cross:—**Studies in English History since the Reformation.**

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which is primarily concerned with the separation from Rome under Henry VIII, and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the

Church are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689.

Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents.

The course for 1907-1908 deals with the Puritan Revolution.
—*Two hours a week, throughout the year.*

AMERICAN HISTORY.

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes a course in American history extending over two years and a half, beginning with lectures on colonial history, and ending with a seminary in which special problems are investigated in original material. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American History, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher. Occasional meetings with advanced students are devoted to a consideration of new books and periodical material in American history.

Assistant Professor PAXSON:—

American Colonial History.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.—*Three times a week, second semester.*

United States History from the Beginning of the Civil War (1860) to the Present Time.

In addition to the political and constitutional questions of the war and reconstruction periods, the lectures will deal with the social and economic conditions existing in the North and the South both during those periods and after. The race question, the "Solid South," the industrial expansion, and the evolution of the United States into a world power will be treated. The lectures will be amplified by assigned reading and special papers.—*Three times a week, first semester.*

American Economic and Social History.

This course is intended to parallel the course on Constitutional and Political History. It covers the same period, extending, however, to 1895. Much stress is laid upon the history of transportation, finance, and social life, together with the economic institutions made necessary in the growth of the United States. There are two lectures a week, through the year, and a third hour in quiz section.

Studies in American History.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Important social, economic, diplomatic and political problems not fully treated in the regular lecture courses are chiefly selected for treatment. Written and oral reports are prepared under the direction of the instructor. Special facilities are given for the use of the library.—*Two hours a week, throughout the year.*

Professor VAN TYNE:—

Constitutional and Political History of the United States, 1775-1861.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lectures, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort is also made to trace the political and social development of the country.—*Three times a week, throughout the year.*

Seminary in American History.

This course is primarily for graduate students who have already done considerable historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. Graduate students will receive individual attention and assistance in the prosecution of their investigations.—*Two hours a week, throughout the year.*

GOVERNMENT.

Professor HUDSON:—

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor FAIRLIE:—

National Administration of the United States.

This course is a study of the United States national government in action. It begins with a brief analysis of the federal system, the organization and procedure of Congress and the special executive powers of the Senate. This is followed by a study of the legislative and administrative powers of the President, the cabinet and each of the executive departments and their various administrative services, such as the diplomatic and consular service, revenue administration, the postoffice, etc. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service. A brief survey will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers and institutions. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the working of the governmental machinery, will be briefly discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, first semester.*

Comparative Administration.

Two courses dealing with national and local administration will be offered in alternate years. In the former a study will be made of the various branches of national administration in the principal European countries in comparison with the corresponding services in the United States. In the second course a similar comparison will be made of American and European local government. Special attention will be given to local administration in the United States and England, showing in the latter country the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the less centralized but more bureaucratic administration in Prussia, and the system of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Two hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval

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cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services; such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties in cities, recent legislation concerning primaries, municipal reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Political Parties.

A study of the development of parties and party organization in Great Britain and the United States, of the present system of party machinery in these countries and its influence on the government, and of recent and proposed political reforms, including legislation on party primaries. Lectures and reading in Ostrogorski's *Democracy and the Organization of Political Parties*, Woodburn's *Political Parties*, Macy's *Party Organization* and other books.—*Two hours a week, one semester.*

Seminary in Administration.

These are courses for original research on special topics, in national, state or local administration. Special arrangements made with qualified students.—*Two hours a week, each semester.*

See also Courses in ROMAN LAW AND JURISPRUDENCE, page 34.

Additional advanced courses in Public Law are offered in the Law Department, viz.: Constitutional Law, Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

INTERNATIONAL LAW.

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

• Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

POLITICAL ECONOMY, SOCIOLOGY, INDUSTRY AND COMMERCE.

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy" or "Social and Industrial Reforms." For descriptions see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as Graduate Courses are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

POLITICAL ECONOMY.

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—
Three hours a week, second semester.

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions.—*Two hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. For the first semester the seminary will investigate special problems in transportation; for the second semester special problems in social reform.

Professor TAYLOR:—

Principles of Finance.

In this connection the word finance is used in the technical rather than the popular sense. That is, it does not include money, banking, stock speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial consideration, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the media of exchange, including money and its various credit substitutes. This is followed by a study of the natural laws governing monetary phenomena, such as those which fix the monetary standard, those regulating the movement and distribution of money, and so on. Next comes a sketch of monetary history,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking instruments and operation. This is followed by a study of banking, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the history of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the nature of capital, the origin of interest, the laws of value, and so on. The work of the class hour includes the discussion of readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses, covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of economic theory, and so on.—*Two hours a week, second semester.*

Doctor SMALLEY:—

Corporations.

This course undertakes a study of corporations as a phase of industrial society. It considers the functions of the promoter and underwriter, the organization of corporations under general laws, corporate securities and management, receiverships and reorganizations. It pays particular attention to those problems—such as promoter's liability, over-capitalization, protection of minority interests, corporation wrecking, etc.—to which the growth of corporations has given rise, and discusses the various programs of public supervision and control.—*Three hours a week, first semester.*

Government Control of Industry.

The aim of this course is to consider industrial regulation from the legal point of view. A study is made of the power of government, under our constitutional system, to control industrial action. This involves, in the main, a discussion of the legal doctrines of the police power and of public policy, as far as they are of economic importance, special attention being paid to their bearing upon the solution of the problems of labor and capital, trusts, railroads, and so forth.—*Two hours a week, second semester.*

SOCIOLOGY.

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements and other sociological questions of present interest.

The class is supplied with a list of about fifty topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

The Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. Cooley's *Human Nature and the Social Order*, Baldwin's *Social and Ethical Interpretations of Mental Development* and other works in this field will be used. This course is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, throughout the year.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient.—*First and second semesters.*

INDUSTRY AND COMMERCE.

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States.

The latter part of the semester is occupied with studies in the industries connected with American agriculture, forestry and mining.—*Three hours a week, first semester.*

The Manufactures of the United States.

The history, methods, present location and condition of our chief manufacturing industries will be presented, the relation of these industries to one another, and to sources of raw materials, means of transportation, market facilities, and foreign trade.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, known as middlemen, who are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

After a preliminary consideration of the institutes of commerce, the systems used in marketing grain, cotton, tobacco, live stock, dairy products, fruits and wool are studied.—*Two hours a week, first semester.*

b. The Manufacturer's Problem of Distribution.

Two hours a week, second semester.

c. Wholesale Trade.

A detailed account of the principles and practices of modern wholesale trade.—*Two hours a week, first semester.*

d. Retail Trade.

The department store is given special attention.—*Two hours a week, second semester.*

Professor GLOVER:—

Mathematics of Insurance.

In connection with the course in Higher Commercial Education six courses are offered upon the actuarial phases and technique of insurance. The theory of the valuation of securities is also presented. For students in this line a statistical laboratory equipped with all necessary computing machines is available. For further information regarding courses in insurance see this Announcement under Mathematics.

A course of lectures on Insurance Law given in the Law Department is open to students in the Department of Literature, Science, and the Arts by special arrangement.

PHILOSOPHY.

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

For the provisions in regard to the fellowship in philosophy, see page 24.

A. SEMINARIES.

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD, Mr. VIBBERT, Mr. SELLARS.

History of Philosophy, Professor LLOYD, Mr. SELLARS.

Ethics, Professors WENLEY and LLOYD, Mr. SELLARS.

Modern Systems, Professors WENLEY and LLOYD, Mr. VIBBERT and Mr. SELLARS.

Ancient Philosophy, Professors FAIRBANKS, WENLEY and REBEC.

Philosophy of Religion, Professor WENLEY and Mr. SELLARS.

Æsthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD, Mr. VIBBERT, and Mr. SELLARS.

Logic, Professor REBEC, and Mr. VIBBERT.

Psychology, Rational, Experimental and Pathological, Professors PILLSBURY and BARRETT, Dr. SHEPARD.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been shelved in the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY.

Professor WENLEY:—

*The Philosophy of Kant.

Proseminary: study of the Critique of Pure Reason.—*Two hours a week, first semester.*

*The Philosophy of Hegel.

Study of the Logic and discussions.—*Two hours a week, second semester.*

Mr. VIBBERT:—

German Pessimism.

Two hours a week, second semester.

Professor LLOYD:—

*Philosophy since Hegel.

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

Mr. SELLARS:—

*Contemporary Metaphysics.

Two hours a week, first semester.

Professor REBEC:—

*American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

Professor FAIRBANKS:—

Plato's Republic.

Collateral reading and theses.—*Two hours a week, first semester.*

C. ETHICS.

*Aristotle's Ethics.

Collateral reading and theses.—*Two hours a week, second semester.*

D. PSYCHOLOGY.

The Psychological Laboratory is well equipped for original investigation; and its facilities have been recently improved by removal to new quarters. See page 18.

Professors PILLSBURY and BARRETT, Dr. SHEPARD:—

Original Investigation.

Hours may be assigned, throughout the year.

Professor PILLSBURY:—

Apperception.

Two hours a week, first semester.

Psychology of the Abnormal and Occult.

Two hours a week, first semester.

Genetic Psychology.

Two hours a week, second semester.

Dr. SHEPARD:—

Psycho-Physical Methods.

Two hours a week, second semester.

E. SPECIAL COURSES.

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1907-1908 to the question of the possibilities of a realistic expression.—*Two hours a week, throughout the year.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1907-08 to the philosophy of evolution.—*Two hours a week, second semester.*

Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

Philosophy of Discourse.

Two hours a week, second semester.

Mr. VIBBERT:—

Pragmatism.

Two hours a week, first semester.

THE SCIENCE AND THE ART OF TEACHING.

Hereafter the History of Education (Courses I and II in the general announcement or their equivalent) will be required as prerequisite for graduate study in this department. In special cases students may be permitted to pursue graduate work simultaneously with the preliminary courses.

Professor WHITNEY:—

School Administration.

Lectures, readings, reports. Advanced students will make a comparative study of foreign school system.—*Two hours a week, both semesters.*

Social Education.

This course embraces a consideration of the school as a social factor in its relation to the child, the home, the state and the church. Also a discussion of the relation of education to vocation and crime. Lectures and recitations.—*Two hours a week, second semester.*

Assistant Professor DE LAGUNA:—**Educational Theories of the Greeks.**

Xenophon's *Memorabilia* of Socrates; Plato's *Protagoras* and *Republic*; Burnet's *Aristotle on Education*. Lectures and recitations.—*Two hours a week, first semester.*

Rousseau, Pestalozzi and Spencer.

A study in educational reform; the development of the naturalistic conception of education. Based on selections from Rousseau's *Emile*, Pestalozzi's *How Gertrude Teaches Her Children*, and Spencer's *Education*.—*Two hours a week, first semester.*

Reading of Recent German Pedagogy.

Reading and discussions of selected texts.—*One hour a week, first semester.*

Evolutionary Aspects of Education.

The bearing of theories of organic and social evolution upon general educational problems. Lectures and discussions.—*Two hours a week, second semester.*

Herbart.

Exposition and criticism of Herbart's pedagogy, with some preliminary account of his ethics and psychology.—*Two hours a week, second semester.*

Moral and Æsthetic Education.

The development of ideals in the race and in the individual. Lectures and recitations.—*Two hours a week, second semester.*

Assistant Professor KING:—**Educational Psychology.**

Lectures, recitations, and reports upon assigned topics and problems. If a sufficient number of graduate students elect this course a seminary will be organized for an intensive study of some phase of the subject.

Psychology of Childhood and Adolescence.

Special opportunities for research work will be offered those desiring to work in this field.

Problems in Contemporary Secondary Education.

If a sufficient number of graduate students desire to do research work in some aspect of modern secondary education a seminary will be formed, provided they have already had the requisite eleven hours for the teacher's diploma.

MATHEMATICS.

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES.

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

Kinetics of the rigid body; motion about a fixed point; the problem of the top; relative motion; D'Alembert's equations; general principles of mechanics.—*Three hours a week, second semester.*

Professor MARKLEY:—

Projective Geometry.

This course begins with the geometry of position, Reye's work being used as a text, which is followed by the analytic treatment, including homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Professor GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots, resultants, solution of a system of n linear equations, theorems concerning integral functions of one and two variables, and elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Dr. PIERCE:—

Elementary Theory of Differential Equations.

A lecture course with references to available literature on the subject. Particular attention will be given to the ideas of Lie.—*Three hours a week, either first or second semester.*

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES.

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Goursat's *Cour d'analyse mathématique*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—**Theory of the Potential.**

Newtonian attraction; Newtonian and logarithmic potentials; the equations of Laplace and Poisson; harmonic functions; the principle of Dirichlet; the problems of Green and Dirichlet and the Green function.—*Three hours a week, first semester.*

Harmonic Analysis.

The partial differential equations of mathematical physics; Fourier series; the Fourier integral; spherical harmonics; Bessel functions; the problem of boundary values for partial differential equations.—*Two hours a week, throughout the year.*

Geometrical Calculus.

The geometry of Grassmann and Peano; Gibbs's vector analysis; scalar and vector fields.—*Two hours a week, first semester.*

Professor MARKLEY:—**Theory of Functions.**

The first part of this course deals with functions of a real variable including a development of the fundamental ideas of irrational numbers, continuity and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometric representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

Theory of Functions. [Advanced Course.]

This course is a direct continuation of the preceding. It includes the theory of elliptic functions.—*Two hours a week, throughout the year.*

Professor GLOVER:—**Seminary in Insurance.**

This course is designed for graduate students who wish to study some of the more advanced problems relating to life contingencies. The following, among others, will be considered: Lexis's theory of population, old age pensions, sickness insurance, theory of risk, Pearson's method of moments, theory of correlation, graduation of mortality and sickness tables, theory of selection, and distribution of surplus.—*Hours to be arranged, throughout the year.*

ASTRONOMY.

Professor HUSSEY:—

Practical Astronomy.

The elements of Spherical Astronomy. Theory of the sextant and transit and their use in the solution of practical problems, including determinations of instrumental constants, time, latitude, longitude, and azimuth.—*Three hours, second semester.*

Advanced Practical Astronomy.

Studies in Spherical Astronomy. Theory of the equatorial and its use in observational work, illustrative of the best modern practice. Reduction of measurements. Open to those who have had the preceding course or its equivalent.—*Three hours, first semester.*

Theoretical Astronomy.

The elements of Celestial Mechanics, and theory and practice in the determination of parabolic and elliptic orbits. A knowledge of Integral Calculus is required.—*Three hours, first semester.*

Advanced Theoretical Astronomy.

Definitive determination of orbits. Comparison and adjustment of observations. Theory of Interpolation, Mechanical Quadrature, Special and General Perturbations. The selection of topics will be determined somewhat by the needs of those taking the course.—*Hours and credit to be arranged, second semester.*

Theory of Errors.

Theory of the comparison and adjustment of observational data according to the Method of Least Squares. Construction and discussion of empirical curves in the solution of experimental problems.—*Two hours, first semester.*

History of Astronomy.

The History of Astronomy from the time of Newton, but treating especially of the development of the science during the past century. The course presupposes a general knowledge of Descriptive Astronomy.—*Two hours, first semester.*

Astrophysics.

Introductory descriptive course. The principles of spectroscopy and bolometry. General treatment of methods and results, having reference especially to the interpretation of solar and stellar phenomena. The course presupposes a general knowledge of Descriptive Astronomy, Physics and Calculus.—*Two hours, second semester.*

PHYSICS.

The courses announced below presuppose about one and a half years' collegiate work in physics; viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Electrochemistry, Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—

Alternating Electric Currents.

An intermediate course based on Franklin & Williamson's Alternating Electric Currents.—*Three hours a week, first semester.*

Professor CARHART and Dr. HENDERSON:—

Electrochemistry.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.—*Four hours a week, second semester, including laboratory work.*

Professor REED:—

The Theory of Sound.

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—*Lectures, two hours a week; laboratory work, twice a week, first semester.*

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer;

determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week*, *second semester*.

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester*.

Professor PATTERSON:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distribution, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week, first semester; twice a week, second semester*.

NOTE: For courses in Applied Electricity, see Electrical Engineering in the Announcement of the Department of Engineering. Seventeen courses in all are there described in detail. They cover the theory, testing and design of electric machinery, transformers, lamps, storage batteries, telegraphy, telephony, electric distribution, power plants, railways, etc. Many of these courses, for example, those in dynamo-electric machinery (both direct and alternating current), in alternating current phenomena, etc., have frequently been accepted toward advanced degrees.

Dr. RANDALL:—

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, first semester*.

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations *two hours a week, second semester*. This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of those principles to numerous problems in physics and chemistry.

Dr. SMITH:—

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester; three times a week, second semester*.

Professors CARHART and REED:—

Physical Colloquium.

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

CHEMISTRY.

Resident graduates may enter upon any of the courses in chemistry in this University for which they are qualified. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to Courses 1, 2, 3, 5 and 7 (University Calendar for 1906-1907), making in all about twenty-five hours of undergraduate credit.* If chemistry is taken as a minor subject by a student registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1, 2 and 3.

Graduate students who are not candidates for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for the convenience of readers.

Professor JOHNSON:—

Advanced Qualitative Analysis.

Following undergraduate Course 3 (University Calendar for 1906-1907).

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during the semester.

Professor CAMPBELL:—**Chemical Colloquium.**

The Chemical Colloquium meets twice a month. Each member of the teaching staff has an opportunity to present at some meeting during the year an account of recent research work in the field in which he is particularly interested.

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1906-1907) or its equivalent. Laboratory work, directed by lectures, in some chosen field of analytical research.

Research in Chemical Technology.

(In conjunction with Assistant Professor WHITE).

The laboratory is equipped for research along the following lines:

1. Influence of heat and mechanical treatment on the constitution of iron and steel.
2. Manufacture of Portland cement with special reference to the influence of composition and temperature of burning upon the physical properties of the finished cement.
3. Destructive distillation of coal, with special reference to the manufacture of gas.
4. Electrometallurgy and applied electrochemistry.
5. Gas analysis, calorimetry and photometry.
6. Assaying of gold and silver ores and research in the technical treatment of ores.

Professor GOMBERG:—**Lectures on the Chemistry of Carbon Compounds.**

A beginning course with library studies.—*Five times a week, the first semester.*

Seminary in Special Topics in Organic Chemistry.

Following undergraduate Course 7 (University Calendar for 1906-1907) or its equivalent.—*Two times a week, second semester.*

Organic Synthesis and Ultimate Analysis.

(In conjunction with Dr. CONE).

Laboratory work.

Investigation in Organic Chemistry.

(In conjunction with Dr. CONE).

Professor SCHLOTTERBECK:—**Phytochemical Research.**

Laboratory investigation of the chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.

Professor BIGELOW:—**Physical and Theoretical Chemistry.**

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—Lectures, *four hours a week, second semester.*

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Laboratory Research in Physical and Electrochemistry.**Assistant Professor STEVENS:—****Drug Assaying, and Pharmacopœial Standards.**

Laboratory work.

Assistant Professor WHITE:—**Chemical Technology.**

Lectures on the main chemical industries, inorganic in the first semester, and organic in the second semester. Among the subjects treated are utilization of fuel, purification of water, the alkali and acid industries, electrochemistry, cement, wood and coal distillations, sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Research in Chemical Technology.

(In conjunction with Professor CAMPBELL, as given above).

Assistant Professor DUNLAP:—**Organic Analysis.**

The technical examination of various organic industrial products, such as oils, fats, waxes, food-stuffs, etc. For those having sufficient preparation, this course may be taken as a research course on some organic-technical problem.

Dr. LICHTY:—**Laboratory Work with the Polariscopes and the Spectroscopes.****Laboratory Research in Inorganic Chemistry.**

Mr. SMEATON:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Laboratory Research in Cryoscopic Methods.

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Stereochemistry, including a General Study of Isomerism.

Lectures, twice a week, second semester.

The Heterocyclic Derivatives in Organic Chemistry.

Lectures, twice a week, second semester.

[This course alternates with the course in Stereochemistry.]

Dr. CONE:—

The Chemistry of Organic Dyes.

Lectures and reading, twice a week, first semester.

Organic Synthesis and Ultimate Analysis.

(In conjunction with Professor GOMBERG, as given above).

Investigation in Organic Chemistry.

(In conjunction with Professor GOMBERG, as given above).

Mr. ZIMMERSCHIED:—

Quantitative Analysis.

Laboratory work.

Micrometallography.

Lectures and laboratory work. *Second semester only.*

Dr. BALCOM:—

Chemistry of the Rare Elements,

including a study of their occurrence, uses, reactions and qualitative detection.—*Second semester only.*

Dr. LIND:—

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and the Phase Rule.—Lectures, *three hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies of solutions, dissociation, conductivity, etc.—*Four times a week, both semesters.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposition potentials, etc.—*One lecture and two laboratory periods a week.*

Thermometry.

Calibrations and high temperature; measurements by all standard methods.—*One lecture and one laboratory period a week.*

Theory and Practice of Exact Measurement,

with laboratory practice in glass blowing, calibration, and construction of apparatus.—*One lecture and two laboratory periods.*

MINERALOGY.

The following courses in mineralogy presupposes a knowledge of general inorganic and analytical chemistry, as well as the principles of general geology.

Professor KRAUS and Mr. HUNT:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—*Lectures five times a week, laboratory work, five hours a week, first semester.*

Mr. HUNT:—

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine, by means of the physical properties, a very large number of minerals.—*Laboratory work, six hours a week, first and second semesters.*

Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first and second semesters.*

Professor KRAUS:—

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential.—*Laboratory work, nine hours a week, first and second semesters.*

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic optical instruments.—*Two lectures and two hours laboratory work a week, second semester.*

Current Literature of Mineralogy.

The instructors and advanced students meet once a week to discuss important current and classic literature.—*Second semester.*

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, or the formation and origin of minerals.

GEOLOGY.

The courses in geology which are arranged for graduate students presuppose a knowledge of the general principles of geology and of mineralogy. For students who plan to become teachers of geology or to engage in research work, it is a distinct advantage for them as undergraduates to map out their courses of study. Inorganic chemistry and physics, as well as the principles of mechanics, are regarded as basal studies for a course in geology; and they should, as far as is possible, be taken early in the course and be followed by a year's course in mineralogy. Sufficient French and German to enable the student to read with ease the scientific literature of the subject should, if possible, be acquired before graduation. An elementary course in surveying to familiarize the student with the use of the compass, level, plane table, and stadia, should, when practicable, be included in the undergraduate study. Course 4 (use of instruments) and the field work of Course 2 (topography) of the Department of Engineering can be taken together, and are especially recommended.

For the graduate and other courses of the geological department the large collections which are on exhibition in the museum or stored in cases, are available for purposes of instruction and, in the case of advanced students, for research work. The new Israel C. Russell Seminary Room with its series of journals, maps, survey reports, etc., and especially its collection of separate geological and geographical memoirs, is supplemented by the main library of the University which is especially rich in geographical journals and texts printed in the English and French languages.

At present the graduate courses offered by the department are in the lines of tectonic and seismic geology, but it is expected

that other courses will be added in the near future. Research work along the lines indicated is especially encouraged, and students may elect geology either as a major or minor subject for a higher degree. (See page 8.)

FOR UNDERGRADUATES AND GRADUATES.

Professor HOBBS:—

Historical Geology.

An outline study of the evolution of continents and of life upon the globe, with consideration of the relation of life forms to changes in the positions and areas of land masses. Lectures, recitations, and laboratory study of fossils.—*Three times a week, second semester.*

Field Petrology.

This course is intended to prepare the student for making rapid determinations of rock types, as is required for geological mapping. Lectures and practical exercises, first with labeled and later with unlabeled specimens.—*Once a week, second semester.*

PRIMARILY FOR GRADUATES.

Seismic Geology.

A study of earthquakes both from the geological and physical sides. The great importance which seismology has assumed within the last few years fully warrants its introduction into the courses of geological departments. The distribution of seismicity upon the globe and within special provinces, the methods of locating lines of special danger from earthquakes, the mitigation of their disastrous consequences, the "distant" study of greater earthquakes, and the use of earthquake instruments, will all be included in the course.—*Twice a week, first semester.*

Tectonic Geography.

The field of study covered by this course lies upon the mutual frontier of structural geology and physiography. The purpose of the course is to study the relations of earth features to the structural planes within the underlying rock basement. The characteristics of each of the better known districts of the globe will be in turn discussed, and students will be expected to gather materials from original sources. Lectures and practical exercises.—*Twice a week, second semester.*

Current Literature of Geology.

All advanced students of the department, and others who desire to do so, will meet for reports and discussion of the recent literature of geology. These reports will be replaced at intervals by the presentation by members of the department of the results of research work upon which they are engaged.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on page 17. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctor's degree a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptation. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours per week, throughout the year.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Dr. CASTEEL:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.—*Five hours, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or physiology. Laboratory work, lectures, and quizzes.—*Four hours per week, second semester.*

Entomology.

A course in the habits, life histories and structures of insects. While seeking to acquaint the student with insect life and structure in general, the course is especially adapted to meet the needs of forestry students and those particularly interested in the economic phases of entomology.—*Three hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Three hours, throughout the year.*

Dr. GLASER:—

Embryology of Vertebrates.

This course aims to give an introduction to the principles of embryological science as illustrated by the development of vertebrates. The lectures will be comparative; the laboratory work, largely on the organogeny of the chick, will be supplemented by demonstration of other embryos. Considerable attention will be given to embryological laboratory methods. This course should be preceded by Zoology 2, or some other adequate equivalent in vertebrate anatomy, histology, and physiology.—*Five hours, first semester.*

Morphogenesis.

This course will consist of lectures and discussions on the factors of development, regeneration, and the general subject of form-regulation. Results of experimental work in embryology will be discussed in relation to the theories of development that have been advanced. Open to students who have taken Course 9 in embryology or other work which affords an adequate preparation for the study of the subjects treated.—*One hour, first semester.*

Special Problems in Morphogenesis.

A laboratory course supplementary to Course 22, with occasional conferences and reports. This course may be elected only after consultation with the instructor.—*Two, three, four or five hours.*

Evolution Problems.

This course consists of lectures, readings and conferences and aims to give a critical appreciation of the development of the evolution theory since Darwin and of the bearing of that development on other fields of knowledge. The theory of evolution has so profoundly influenced psychology, ethics, and social science, to say nothing of other fields, that an acquaintance with the ground and import of this theory is a necessary part of the equipment of the student in any of the fields, as well as of the biologist who has an interest in the broader aspects of his subject. It is the purpose of the course to give the student the necessary basis for appreciating in some degree the import of biology.—*Two hours, second semester.*

Dr. NEWMAN:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures or recitations per week.—*Two hours per week, second semester.*

Heredity.

This course gives an exposition and critical discussion of the results of recent investigation in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that it be preceded by the course in Organic Evolution. This course should be of value to students specializing in sociology, psychology, and medicine, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Short Course in Zoology.

This course aims to present, in brief outline, by means of a text-book, the more important facts concerning the animal kingdom and to illustrate them by specimens. It thus gives a bird's-eye view of the whole subject not possible in the more special courses. It is intended for forestry students, and as a review course for those preparing to teach zoology, but may be taken by others.—*Three hours, second semester.*

Dr. RUTHVEN:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology.

The lectures and conferences outline the general principles. The field trips are devoted to the study of animals and of the conditions under which they live; to methods of observation, taking notes and collecting. Special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and to amphibians and reptiles among vertebrates.

Professor SCHLOTTERBECK:—**Phytochemical Research.**

Laboratory investigation of the chemical constitution of alkaloids and other principles of plants of related species grown in the botanical gardens.

Professor BIGELOW:—**Physical and Theoretical Chemistry.**

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—Lectures, *four hours a week, second semester.*

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Laboratory Research in Physical and Electrochemistry.**Assistant Professor STEVENS:—****Drug Assaying, and Pharmacopœial Standards.**

Laboratory work.

Assistant Professor WHITE:—**Chemical Technology.**

Lectures on the main chemical industries, inorganic *in the first semester*, and organic *in the second semester*. Among the subjects treated are utilization of fuel, purification of water, the alkali and acid industries, electrochemistry, cement, wood and coal distillations, sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Research in Chemical Technology.

(In conjunction with Professor CAMPBELL, as given above).

Assistant Professor DUNLAP:—**Organic Analysis.**

The technical examination of various organic industrial products, such as oils, fats, waxes, food-stuffs, etc. For those having sufficient preparation, this course may be taken as a research course on some organic-technical problem.

Dr. LICHTY:—**Laboratory Work with the Polariscopes and the Spectroscopes.****Laboratory Research in Inorganic Chemistry.**

Mr. SMEATON:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Laboratory Research in Cryoscopic Methods.

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Stereochemistry, including a General Study of Isomerism.

Lectures, twice a week, second semester.

The Heterocyclic Derivatives in Organic Chemistry.

Lectures, twice a week, second semester.

[This course alternates with the course in Stereochemistry.]

Dr. CONE:—

The Chemistry of Organic Dyes.

Lectures and reading, twice a week, first semester.

Organic Synthesis and Ultimate Analysis.

(In conjunction with Professor GOMBERG, as given above).

Investigation in Organic Chemistry.

(In conjunction with Professor GOMBERG, as given above).

Mr. ZIMMERSCHIED:—

Quantitative Analysis.

Laboratory work.

Micrometallography.

Lectures and laboratory work. *Second semester only.*

Dr. BALCOM:—

Chemistry of the Rare Elements,

including a study of their occurrence, uses, reactions and qualitative detection.—*Second semester only.*

Dr. LIND:—

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and the Phase Rule.—Lectures, *three hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies of solutions, dissociation, conductivity, etc.—*Four times a week, both semesters.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposition potentials, etc.—*One lecture and two laboratory periods a week.*

Thermometry.

Calibrations and high temperature; measurements by all standard methods.—*One lecture and one laboratory period a week.*

Theory and Practice of Exact Measurement,
with laboratory practice in glass blowing, calibration, and construction of apparatus.—*One lecture and two laboratory periods.*

MINERALOGY.

The following courses in mineralogy presupposes a knowledge of general inorganic and analytical chemistry, as well as the principles of general geology.

Professor KRAUS and Mr. HUNT:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—*Lectures five times a week, laboratory work, five hours a week, first semester.*

Mr. HUNT:—

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine, by means of the physical properties, a very large number of minerals.—*Laboratory work, six hours a week, first and second semesters.*

Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first and second semesters.*

Professor KRAUS:—

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential.—*Laboratory work, nine hours a week, first and second semesters.*

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic optical instruments.—*Two lectures and two hours laboratory work a week, second semester.*

Current Literature of Mineralogy.

The instructors and advanced students meet once a week to discuss important current and classic literature.—*Second semester.*

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, or the formation and origin of minerals.

GEOLOGY.

The courses in geology which are arranged for graduate students presuppose a knowledge of the general principles of geology and of mineralogy. For students who plan to become teachers of geology or to engage in research work, it is a distinct advantage for them as undergraduates to map out their courses of study. Inorganic chemistry and physics, as well as the principles of mechanics, are regarded as basal studies for a course in geology; and they should, as far as is possible, be taken early in the course and be followed by a year's course in mineralogy. Sufficient French and German to enable the student to read with ease the scientific literature of the subject should, if possible, be acquired before graduation. An elementary course in surveying to familiarize the student with the use of the compass, level, plane table, and stadia, should, when practicable, be included in the undergraduate study. Course 4 (use of instruments) and the field work of Course 2 (topography) of the Department of Engineering can be taken together, and are especially recommended.

For the graduate and other courses of the geological department the large collections which are on exhibition in the museum or stored in cases, are available for purposes of instruction and, in the case of advanced students, for research work. The new Israel C. Russell Seminary Room with its series of journals, maps, survey reports, etc., and especially its collection of separate geological and geographical memoirs, is supplemented by the main library of the University which is especially rich in geographical journals and texts printed in the English and French languages.

At present the graduate courses offered by the department are in the lines of tectonic and seismic geology, but it is expected

that other courses will be added in the near future. Research work along the lines indicated is especially encouraged, and students may elect geology either as a major or minor subject for a higher degree. (See page 8.)

FOR UNDERGRADUATES AND GRADUATES.

Professor HOBBS:—

Historical Geology.

An outline study of the evolution of continents and of life upon the globe, with consideration of the relation of life forms to changes in the positions and areas of land masses. Lectures, recitations, and laboratory study of fossils.—*Three times a week, second semester.*

Field Petrology.

This course is intended to prepare the student for making rapid determinations of rock types, as is required for geological mapping. Lectures and practical exercises, first with labeled and later with unlabeled specimens.—*Once a week, second semester.*

PRIMARILY FOR GRADUATES.

Seismic Geology.

A study of earthquakes both from the geological and physical sides. The great importance which seismology has assumed within the last few years fully warrants its introduction into the courses of geological departments. The distribution of seismicity upon the globe and within special provinces, the methods of locating lines of special danger from earthquakes, the mitigation of their disastrous consequences, the "distant" study of greater earthquakes, and the use of earthquake instruments, will all be included in the course.—*Twice a week, first semester.*

Tectonic Geography.

The field of study covered by this course lies upon the mutual frontier of structural geology and physiography. The purpose of the course is to study the relations of earth features to the structural planes within the underlying rock basement. The characteristics of each of the better known districts of the globe will be in turn discussed, and students will be expected to gather materials from original sources. Lectures and practical exercises.—*Twice a week, second semester.*

Current Literature of Geology.

All advanced students of the department, and others who desire to do so, will meet for reports and discussion of the recent literature of geology. These reports will be replaced at intervals by the presentation by members of the department of the results of research work upon which they are engaged.

ZOOLOGY.

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on page 17. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is also accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work will ordinarily include research.

For the doctor's degree a minor in zoology will involve about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palaeontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES.

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptation. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours per week, throughout the year.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Dr. CASTEEL:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.—*Five hours, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or physiology. Laboratory work, lectures, and quizzes.—*Four hours per week, second semester.*

Entomology.

A course in the habits, life histories and structures of insects. While seeking to acquaint the student with insect life and structure in general, the course is especially adapted to meet the needs of forestry students and those particularly interested in the economic phases of entomology.—*Three hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Three hours, throughout the year.*

Dr. GLASER:—

Embryology of Vertebrates.

This course aims to give an introduction to the principles of embryological science as illustrated by the development of vertebrates. The lectures will be comparative; the laboratory work, largely on the organogeny of the chick, will be supplemented by demonstration of other embryos. Considerable attention will be given to embryological laboratory methods. This course should be preceded by Zoology 2, or some other adequate equivalent in vertebrate anatomy, histology, and physiology.—*Five hours, first semester.*

Morphogenesis.

This course will consist of lectures and discussions on the factors of development, regeneration, and the general subject of form-regulation. Results of experimental work in embryology will be discussed in relation to the theories of development that have been advanced. Open to students who have taken Course 9 in embryology or other work which affords an adequate preparation for the study of the subjects treated.—*One hour, first semester.*

Special Problems in Morphogenesis.

A laboratory course supplementary to Course 22, with occasional conferences and reports. This course may be elected only after consultation with the instructor.—*Two, three, four or five hours.*

Evolution Problems.

This course consists of lectures, readings and conferences and aims to give a critical appreciation of the development of the evolution theory since Darwin and of the bearing of that development on other fields of knowledge. The theory of evolution has so profoundly influenced psychology, ethics, and social science, to say nothing of other fields, that an acquaintance with the ground and import of this theory is a necessary part of the equipment of the student in any of the fields, as well as of the biologist who has an interest in the broader aspects of his subject. It is the purpose of the course to give the student the necessary basis for appreciating in some degree the import of biology.—*Two hours, second semester.*

Dr. NEWMAN:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures or recitations per week.—*Two hours per week, second semester.*

Heredity.

This course gives an exposition and critical discussion of the results of recent investigation in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that it be preceded by the course in Organic Evolution. This course should be of value to students specializing in sociology, psychology, and medicine, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Short Course in Zoology.

This course aims to present, in brief outline, by means of a text-book, the more important facts concerning the animal kingdom and to illustrate them by specimens. It thus gives a bird's-eye view of the whole subject not possible in the more special courses. It is intended for forestry students, and as a review course for those preparing to teach zoology, but may be taken by others.—*Three hours, second semester.*

Dr. RUTHVEN:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology.

The lectures and conferences outline the general principles. The field trips are devoted to the study of animals and of the conditions under which they live; to methods of observation, taking notes and collecting. Special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and to amphibians and reptiles among vertebrates.

The course is intended as an introduction to the study of the local distribution of animals and its interpretation. It should be of value to those seeking a general culture course, as well as to teachers of nature study and of elementary zoology.—*Three hours, second semester.*

B. PRIMARILY FOR GRADUATES.

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.

Dr. CASTEEL:—

Habits of the Social Hymenoptera.

Dr. NEWMAN:—

Problems in Physiological Zoology.

Dr. GLASER:—

Problems in vertebrate and invertebrate embryology.

The ZOOLOGICAL FACULTY:—

Journal club.

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—*One hour a week, throughout the year.*

The BIRD CLUB:—

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

BOTANY.

The work in botany in this University is divisible into morphology, physiology, and ecology. For the study of these branches there are specially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contain 80,000 specimens, being especially rich in algae and economic fungi. The University Botanical Garden and Arboretum now being planted, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to the preparation and the needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctor's degree, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found elsewhere in this Announcement. (See page 9.)

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below.

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours' laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five credit hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses; the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more credit hours a week, throughout the year.*

Teachers' Course.

Conference and reports on books, apparatus and material for high school laboratories; practical methods of collecting and preserving material and conducting field observations; preparation of outlines of courses for secondary schools.—*One credit hour a week, second semester.*

Assistant Professor POLLOCK:—**Morphology and Classification of Fungi.**

Three credit hours a week, first semester.

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three credit hours a week, second semester.*

Assistant Professor BURNS:—**Biological Relations of Plants.**

Lectures, with reviews of recent literature of ecology and distribution, accompanied by field studies of habits and adaptations, and laboratory work on ecological anatomy. *Two credit hours a week, first semester.* By permission, students who are prepared to take up special problems may elect this course as *three or more hours.*

Variation under Natural and Artificial Conditions.

Plant breeding. Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two credit hours a week, first semester.*

Ecology.

A study of the habits and adaptation of plants. The floras of hills and valleys, of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more credit hours a week, second semester.*

Botanical Survey of the Huron Valley.

A limited number of students will be given opportunity to take part in a systematic study of the local flora.—*Two or more credit hours a week, second semester.*

The BOTANICAL FACULTY:—**Current Literature of Botany.**

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

Biological Problems and Theories.

This course consists of one lecture a week during the second semester on current problems and theories in biology, such as the origin of life, heredity, morphogenesis, mutation, inheritance in hybrids, mechanism and vitalism, senescence and death.

B. PRIMARILY FOR GRADUATES.

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Assistant Professor POLLOCK:—

Investigations in the Morphology and Physiology of Fungi and in Plant Pathology.

Assistant Professor BURNS:—

Investigations in Ecology and Experimental Morphology.

Problems in field and laboratory work.

FORESTRY.

Assistant Professor MULFORD:—

Silviculture.

This course is given as follows:

(1a) Silviculture. Introductory, including the study of soil, climate and other conditions.—*Three hours, first semester.*

(1b) Silviculture. Method of artificial and natural reproduction; seedbed and nursery work; planting and sowing in forest; reforestation of denuded lands, prairies, dunes, etc.—*Three hours, second semester.*

(1c) Silviculture. Care of forests; cleaning and thinning; protection of forests against insects and other enemies.—*Three hours, first semester.*

Courses 1a, 1b, and 1c should be taken in the order here given.

Forest Mensuration and Description.

Lectures, laboratory work, and field work—*Three hours, throughout the year.*

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurements of the rate of growth of trees and stands; methods and manner of describing a tract of forest; forest survey.

Open only to students of forestry in first year.

Dendrology.

Monographic study of forest trees; their life history; distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory work and field work.—*Three hours, second semester.*

Open only to forestry students in first year.

Professor ROTH:—**Forest Utilization.**

Use of timber; points of production and market; method of lumbering, milling, and marketing; minor forest industries. Lectures.—*Four hours, second semester.*

Open only to forestry students in their second year.

Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved in judging the value of the forests and forest operations. Lectures and field work.—*Five hours, throughout the year.*

Open only to forestry students in their second year.

ANATOMY AND HISTOLOGY.**Professors McMURRICH and HUBER:—****Anatomy of the Central Nervous System.**

This course consists of a detailed study of the structure of the central nervous system, and is open only to students who have taken anatomy Course 4 or an equivalent.—*Three hours, first or second semester.*

Anatomy and Histology of the Special Sense Organs.

Open only to students who have already taken a course in histology.—*Hours to be arranged with the instructor, throughout the year.*

Anatomical Research.**Histological Research.**

Courses 3 and 4 are open only to students who have had the necessary preliminary preparation.—*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY.

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirements for a minor for the master's degree is five hours of lectures the first semester, four hours the second semester, a laboratory course of five afternoons a week for eight weeks, and a report on the literature of some limited subject. The four hour lecture course given in the second semester, should be taken before the five hour course on the first semester. No research work will be required, except from those who have already taken advanced work in physiology. The requirements for a major for the master's degree includes, in addition to the requirements for the minor, research work during half of one semester, performed under direction.

The requirements for a minor for a doctor's degree involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a major for the doctor's degree is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; four hours a week, second semester.

Laboratory Course.

Fifteen hours a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY.

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN:—

Food Analysis.

Water Analysis.

Research on the Chemistry of Bacteria.

Students doing graduate work in these subjects will be required to work in each subject for at least one year.

Professor NOVY:—

Special Methods in Bacteriology.

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum agglutination, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1906-1907.—*It is given in the first half of the second semester.*

Pathogenic Protozoa.

The work in protozoology is given in the second half of the second semester and follows Course 1, which must precede it. Special attention is given to the study of the blood parasites, such as trypanosomes, plasmodia, piroplasms, hemogregarines, etc. The spirochetes are also taken up in this course. As far as practicable infected animals are provided for the student and an opportunity is given to do experimental work with insect hosts, as mosquitoes, ticks, etc.

Research in Bacteriology and Protozoology.

Advanced Physiological Chemistry.

Laboratory work and reading.—*Second semester.*

SUMMER SESSION, 1907

LATIN

Opportunities for graduate work in Latin will be offered during the Summer Session. This work is accepted as a partial fulfillment of the residence requirement for the higher degrees. The courses announced below are merely tentative, as the work will be adapted in each case to the individual needs of the student.

Assistant Professor SANDERS:—

The Sources of Roman Historians, and Roman Literature.

These two courses, offered primarily for teachers and undergraduates, may be elected by graduate students, who are taking minors in these subjects, as preparation in part for their examination.

Latin Palaeography.

Lectures on the various styles of writing and direction in the reading of facsimiles from the collections in the University library. Open to graduate students only.

Assistant Professors MEADER and SANDERS:—

Historical Latin Grammar.

Lectures on the development of the study of Latin grammar, the origin and development of the alphabet, the position of Latin in the Indo-European family of languages, history of the Latin sounds, Latin etymology, the development of noun and verb inflections including word formation, historical syntax.

Latin Language.

Graduate students will be given direction along special lines of study in the fields of phonology, morphology, semasiology, syntax and style.

Professor KELSEY:—

Teachers' Course.

The Orations and Letters of Cicero.—Study of the oration as a literary type and of select orations of Cicero, preference in selection being given to the orations ordinarily read in the schools, characteristic passages of which will be interpreted and discussed in class; also a study of Cicero's letters as casting light upon the interpretation of the oration and upon the orator's point of view.

Cicero's Philosophical Works.

Lectures. Interpretation of selected books of the *De Natura Deorum* and *Tusculan Disputations*. Open to graduate students only.

FRENCH

Graduate students competent to enroll for a higher degree who wish to work in French will be given direction along the lines best suited to their needs. Only the general division of the work is indicated below. Candidates for graduate work are urged to confer personally or by letter with the instructor in charge of the subject they wish to take up before the beginning of the session.

Professor EFFINGER:—

Modern French Literature.

Work will be directed, according to the needs of students, in the study of special periods, of the history of special literary forms, as the drama or the novel, or of particular authors, or in the investigation of a special question.

Professor CANFIELD:—

French Philology and Old French.

Students will be given direction either in an introductory study of the elements of historical grammar or of the literature of the Old French period, or in a more thorough study of selected texts or of special subjects connected with mediæval literature.

GERMAN

The advanced and graduate courses in German, announced below, presupposes a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 9a, 10 and 10a, and options in 5a, 5b, 5c, 5d, 5e, 7, 6a, 6b, 6c, 6d, 6e, and 8, as described in the University Calendar for 1906-1907, or work equivalent to the courses mentioned.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Francke History of German Literature. Advanced course open to undergraduates and graduates.

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.

That one of the above three courses will be given which is elected by the larger number of students.

Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.

Of the above three courses, the two elected by the larger number of students will be given during the Summer Session.

ENGLISH

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in English along the lines best suited to their needs. The courses offered below are considered well adapted to the greater number.

FOR GRADUATES AND UNDERGRADUATES.

Assistant Professor TATLOCK:—

Chaucer.

The aim of this course is to give the student three things, some acquaintance with mediæval life as it is illustrated by the *Canterbury Tales*, an understanding of the English language of the 14th century, and a familiarity with Chaucer and his poetry. A system of pronunciation will be taught approximating to that of the 14th century. The Prologue and several of the *Tales* will be read in class, and some of Chaucer's other works will be assigned for outside reading.

Assistant Professor TILLEY:—

Historical English Grammar.

By the study of the principles of historical grammar, of comparative grammar, and of the psychology of speech, modern English grammar is shown to be a living outgrowth of the past stages of the language. This course is designed especially for teachers of English grammar.

PRIMARILY FOR GRADUATES.

Professor DEMMON:—

Dramatic History and Technique.

With special reference to Shakespeare, his predecessors and his contemporaries. This course is designed primarily for graduate students working towards a higher degree. Pollard's "*English Miracle Plays*," Woodbridge's "*Drama, its Law and its Technique*," TenBrink's "*Five Lectures on Shakespeare*," and Lewis Campbell's "*Tragic Drama, etc.*," will be found useful books of reference for this course.

RHETORIC

FOR GRADUATES AND UNDERGRADUATES.

Assistant Professor THOMAS:—

Advanced Exposition.

Interpretation and appreciation of literature. A discussion of the theories of leading critics will be followed by an analysis of noted criticisms. The principles discovered will then be applied to specimens of literature. This course will be conducted as a seminary. Open only to students who have permission.

Methods of Teaching Rhetoric and Composition.

This course will include not only a consideration of methods, text-books, aids, etc., but also an attempt to develop in the student the ability to make his criticism constructive.

PRIMARYLY FOR GRADUATES.

Rhetorical Theory.

From a concrete study of selected passages from De Quincey the fundamental problems of rhetoric will be evolved. The various methods of approach will be outlined, and an attempt made to show the psychological and sociological bases of rhetorical processes.

HISTORY

Courses in American Colonial History, and Social and Industrial History of the United States, similar to those described in the general announcement, are offered also in the Summer Session, primarily for undergraduates, but may, under certain conditions, be taken by graduates.

FOR GRADUATES AND UNDERGRADUATES.

Professor MORAN:—

History of Europe During the Nineteenth Century.

As an introduction to the course a general summary of the causes and results of the French Revolution is given. The course includes a study of the Congress of Vienna and the period of reaction; the progress of the European States toward democracy; France since 1815; Spain and the revolt of her American colonies; the unification of Italy; Bismarck and the German Empire; the Austro-Hungarian Monarchy; the Scandinavian countries; Russian development and the "Eastern Question"; the expansion of the European States; industrial and commercial development of Europe; and some phases of world politics.

Assistant Professor PAXSON:—

Seminary in American History.

The seminary in American history, while primarily intended for advanced students, who desire to do original research, will be open to those who wish training in the more elementary matters of bibliography and method of presentation. The work will be in the field of the "Westward Movement," the topics assigned dealing with the problems incidental to movements in population and changes in standard of life. As much stress will be laid upon methods of investigation, arrangement and use of materials, and historical style, as upon amounts and quality of information acquired. There will be lectures on bibliography and methods, consultations, and individual reports.

GOVERNMENT

Professor FAIRLIE:—

American State and Local Government.

A general and comparative study of government in the different States of the American Union. After tracing the development of State Constitutions, each of the departments of government will be examined; the legislatures, the judiciary, the governors and other State officers and institutions. Local government in counties, townships and cities will also be examined. Lectures and assigned reading.

POLITICAL ECONOMY

Professor TAYLOR:—

Money and Banking.

Text-book and lectures. The time of this course will be divided between Money and Banking in about the ratio of 2 to 1. The work in each subject will include both theory and history. On the historic side the experience of our own country will naturally receive most attention. The student will need White's Money and Banking, and Dunbar's History and Theory of Banking.

Doctor SMALLEY:—

The Corporation Problem.

This course undertakes a study of corporations as an element in industrial society. It deals, first, with the nature and history of corporations, and their significance in modern life. It then offers an account of the promotion, capitalization, management, dissolution and reorganization of corporations,—a discussion designed especially to disclose the evils to which the growth of corporations has given rise. The course concludes with a consideration of various remedies for these evils, including public control of corporations, special attention being given to the proposal of federal incorporation.

Economic Problems.

With special reference to their legal aspects. An examination of economic problems,—such as the problems of Trusts, Railroads and Labor—with the special purpose of determining the extent to which, under our constitutional system, governmental regulation may be employed as a means for their solution.

PHILOSOPHY

Professor WENLEY:—

Seminary in Ethics.

Professor LLOYD:—

Seminary in History of Philosophy.

The work of this seminary will be arranged according to the requirements of students who elect it.

Professor REBEC:—

Seminary in Æsthetics.

Primary regard will be had, in this course, to the needs of students pursuing æsthetics as one of their subjects for a higher degree; however, as such persons will commonly be students *in absentia*, whose chief need will be to have problems intelligently raised for them, and broad outlines of work sketched out, with solutions only broadly indicated, the work of the course cannot be too narrowly specialized or even technical.

PSYCHOLOGY

Professor PILLSBURY:—

Experimental Psychology.

For graduates and undergraduates. An introduction to experimental methods, with the repetition of classical experiments. Special emphasis will be placed on methods that can be applied in school practice. The work may be divided to suit the needs and attainments of the individual student.

THE SCIENCE AND THE ART OF TEACHING

FOR GRADUATES AND UNDERGRADUATES

Assistant Professor KING:—

The Psychology of Childhood and Adolescence.

The course will first outline the facts thus far known regarding the first steps in physical and mental development; on the basis of which there will follow an investigation and discussion of children's traits in the different periods of development. Special attention will be given to such problems as the development of motor co-ordinations, skill, language, moral ideas, the place of imitation in mental development; the hygiene and diet of the various periods of growth; mental and physical abnormalities. The place and importance of practical child-study in a

school system will be considered. All the more recent literature of the subject will be critically examined, and students will make observations and reports. Especially recommended for superintendents. General psychology a prerequisite. Graduate students will do additional work on assigned problems.

Problems in Contemporary Education.

A discussion of various topics related to the conception of education as a social process; e. g., the child as an educable being, the factors of psychical and social heredity, the function of the teacher, the relation of the school to the home, and society, the significance and place of the curriculum of studies in the educational process, the relative value of studies, formal discipline, etc. Those pursuing this course will be expected to familiarize themselves with a wide range of recent literature dealing with educational theory and practice, with a view to reaching some definite formulation of the trend of current elementary and secondary education. For senior and graduate students. Lectures, discussions, themes.

PRIMARILY FOR GRADUATES

Professor REBEC:—

Educational Ideas of the French Revolutionary Era.

Special study of Rousseau and Pestalozzi; reading of *Emile* and *How Gertrude Teaches Her Children*.

MATHEMATICS

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in mathematics along lines best suited to their needs. Such work when satisfactorily completed will be accepted as a partial fulfillment of the residence requirements for such degree. The courses offered below are considered well adapted to the greater number.

FOR GRADUATES AND UNDERGRADUATES.

Professor BEMAN:—

Differential Equations.

An elementary course in ordinary differential equations.

Text-book: Johnson's *Differential Equations*.

Professor MARKLEY:—

Projective Geometry.

Lectures and assigned reading and recitations in text-book.

Theory of Functions.

Lectures and assigned reading and recitations.

Those desiring to take this work are requested to correspond with the instructor in charge.

ASTRONOMY

Professor HUSSEY:—

Practical Astronomy.

Theory of the sextant and transit and their use in the solution of practical problems, including determinations of instrumental constants, time, latitude, longitude, and azimuth. Recitations in Room 22, U. H., at 11, during the first two and the last week of the term; laboratory work at the Observatory, partly in the afternoon and partly in the evening, during the third, fourth and fifth weeks of the term.

Theoretical Astronomy.

The elements of celestial mechanics and theory and practice in the determination of parabolic and elliptic orbits. Integral calculus is a pre-requisite.

PHYSICS

Graduate students qualified to enroll for a higher degree will be afforded an opportunity to do work in Physics in the direction best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number

FOR GRADUATES AND UNDERGRADUATES.

Dr. SMITH:—

Electrical Measurements.

Recitations at 8, laboratory work daily two hours. This course corresponds to the regular Course 5 in physics and includes measurements of resistance, electromotive force, current, capacity, self and mutual induction, and a study of the magnetic properties of iron and steel. Text-book: Carhart and Patterson's Electrical Measurements.

Advanced Electrical Measurements.

Continuation of Course 6. Laboratory work and reading, daily, at hours to be arranged.

Assistant Professor RANDALL:—

Theory of Heat.

Recitations and reading. Text-book: Preston's Theory of Heat.

Laboratory Work in Heat.

This course corresponds to the regular Course 8. It is offered for those who wish to become acquainted with the more advanced methods for measurements in heat. The course includes measurements of the expansion of solids, liquids, and gases, the specific heat of liquids and gases, vapor tensions, and thermal conductivities.

Measurements of High Temperatures.

This course corresponds to the regular Course 17. Opportunity is offered to work with the gas thermometer, thermo-element, and resistance thermometer.

Professor REED:—

Sound and Other Oscillatory Phenomena.

This course includes the study of the origin, propagation and phenomena of sound; the differential equations of motion for systems having one and two degrees of freedom; the characteristic phenomena of free, forced, and damped vibrations; resonance; applications of Fourier's series to specific cases; theory of electric oscillations; stationary electric waves; electric resonance and tuning. Lectures, laboratory work and reading.

Theory of Light.

The aim of this course is to present to the student an intelligent account of the fundamental facts in modern optics. A brief treatment of geometrical optics is followed by the study of the phenomena of interference, diffraction, dispersion, absorption and polarization from the theoretical and experimental standpoints. The large equipment of the laboratory in optical apparatus renders the work in this line especially attractive. Text-book: Preston's Theory of Light.

PRIMARILY FOR GRADUATES.

Advanced Work in Light.

Laboratory work and reading, for students qualified to pursue independent investigation. Text-book: Mann's Advanced Optics.

Advanced Work in Sound.

Laboratory work and reading along some line of research work involving acoustic or electric vibrations.

CHEMISTRY

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in Chemistry along the lines best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number.

Dr. CONE:—

Organic Preparations.

Laboratory work daily, with reference reading and quiz upon synthetic principles. Ultimate analysis may be included.

Mr. SMEATON:—

Recent Theory Bearing on Analytical Chemistry.

Lectures following in outline Ostwald's Scientific Foundations of Analytical Chemistry.

Dr. LIND:—

Elementary Theoretical and Physical Chemistry.

Lectures and recitations. The most essential theories and principles underlying the science of chemistry are discussed and their bearing on some of the usual chemical operations illustrated. Among the topics treated are: The gas laws; Avogadro's hypothesis; the determination of molecular weights; the theory of solutions, including osmotic pressure, electrical conductivity, and the ionic dissociation theory; law of mass action.

Physical-chemical Measurements (Laboratory).

The following determinations are made: Vapor density by the methods of Victor Meyer, Bleier and Kohn, and Dumas; molecular weight measurements by freezing point and boiling point methods; electrical conductivity.

MINERALOGY

Professor KRAUS:—

Graduate Course.

Laboratory work and reading adapted to the needs of graduate students competent to enroll for a higher degree. The work may involve the measurement and projection of crystals, chemical crystallography, or the formation and origin of minerals.

BOTANY

Graduate students of this and other approved institutions competent to enroll for a higher degree will be afforded an opportunity to do work in botany along the lines best suited to their needs. Such work when satisfactorily completed, will be accepted as a fulfillment of the requirement for such degree. In order to secure the master's degree in summer school the student should devote one-half his

time for five summers (15 hours) to graduate work in botany for a major or one-fourth this for a minor. The courses outlined below offer an opportunity for fulfilling these conditions.

FOR GRADUATES AND UNDERGRADUATES.

Assistant Professor POLLOCK:—

Plant Disease.

The aim of this course is to make the student familiar with some of the more common diseases of plants which are caused by other plant agencies, Bacteria, Fungi, etc. The diseased plants will be studied with reference to the changes in structure or function produced by the disease; that is, the general pathological condition, and the organisms which cause the disease will be studied with reference to their life history and the conditions under which they develop. Methods of making culture media and obtaining pure cultures of organisms that cause disease will be studied. Field excursions will be made, to collect specimens of diseased plants and to observe them in their natural habitat. This material will be taken to the laboratory for identification. A part of the work will consist in the inoculation of healthy plants with disease-producing germs, and watching the progress of the disease. Laboratory work eight hours per week for two hours credit, and twelve hours per week for four hours credit, between 9 and 12. Besides the laboratory work some collection and identification of material must be done for the four hours credit. This collection must be done afternoons or Saturdays. Laboratory fee, \$2.00 or \$4.00.

Assistant Professor BURNS:—

Advanced Course in Ecology.

This course will treat of the geographical distribution of plants, and of the relation of plant societies to the physiographic development of the various land forms. It is specially designed to show the result of continuous physiographic change upon plant distribution, and the consequent shifting of plant societies. The course must be preceded or accompanied by Course 2. Lectures and field work.

PRIMARILY FOR GRADUATES.

Research in Ecology.

Special problems will be given to advanced students. An effort will be made to take up problems which may be farther studied by the student in any locality. This course is open only to those who receive special permission from the instructor.

Assistant Professor POLLOCK:—

Research in Plant Pathology.

Opportunity will be afforded for competent students to undertake work along the line of special problems in plant disease.

HIGHER DEGREES CONFERRED IN 1906

MASTER OF SCIENCE

(IN FORESTRY)

Willard Melvin Drake, A.B., <i>Bates College</i>	Frank Jay Phillips, A.B. Wilfred Wallace White, B.S., <i>Haverford College, M.S., Penn College</i>
Earl Hazeltine Frothingham, A.B.	
Frank Benjamin Moody, A.B., <i>Bates College</i>	

MASTER OF SCIENCE

Charles Wilford Cook, A.B.	Oscar Herman Wurster, A.B.
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MASTER OF ARTS

Charlotte Zulima Aldrich, Ph.B., <i>Albion College</i>	William Rufus Goodrich, A.B. Minnie Almira Graham, A.B., <i>Mount Holyoke College</i>
Joseph Emanuel Alexander Alexis A.B., <i>Augustana College</i>	Edna Grant, A.B., <i>Oberlin Col- lege</i>
Frank Eugene Andrews, B.S.	Nina Maud Houser, A.B.
George William Barnum, A.B.	Anna Joseph, A.B., <i>University of Kansas</i>
Oswald Frederic Boucke, A.B.	Carlos Pointon Long, A.B.
John R. Brumm, A.B.	William Arnold Ludwig, B.S.
Warren David Brush, B.S., <i>Bald- win University</i>	Frank John Mellencamp, A.B.
Elizabeth Margaret Bush, A.B.	Edla Maud Niles, Ph.B.
James Andrew Campbell, A.B.	Mahlon Ellsworth Olsen, A.B.
James Allen Canby, A.B., <i>Beth- any College</i>	Homer Elmer Robbins, A.B.
Herbert Watson Clark, A.B.	Adolph Marius Rovelstad, A.B., <i>St. Olaf College</i>
Frances Elizabeth Clarke, B.L.	Howard Lesher Schug, A.B.
Mabel Rebekah Collins, Ph.B., <i>Albion College</i>	Ole Tonning, A.B., <i>Luther Col- lege</i>
Cornelia Alice Copeland, A.B.	Ida Margaret Walz, A.B.
Evelyn Gail Gardiner, A.B., <i>Vas- sar College</i>	George Rufus Wheeler, A.B., <i>Albion College</i>
Frances Sweet Gibson, A.B., <i>Al- bion College</i>	

DOCTOR OF PHILOSOPHY

William Edward Bohn, A.B., *German Wallace College*, 1899, A.M.,
Ohio State University, 1900
Rhetoric; English Literature; Aesthetics
Thesis, The Development of John Dryden's Critical Theory

Alfred Dachnowski, A.B., *Taylor College*, 1897, A.M., *ibid.*, 1900,
Angeline Bradford Whittier Fellow in Botany, 1905-1906
Plant Physiology; Botany; Modern Philosophy
Thesis, Beitrag zur Kenntniss der Entwicklungs-Physiologie von
Marchantia polymorpha, L

Robert Byrns English, A.B., *University of Rochester*, 1896, A.M.,
ibid., 1898, *Buhl Classical Fellow*, 1904-1905

Latin; Greek; Ancient Philosophy

Thesis, The Right Hand in Roman Art and Literature

John Sharpless Fox, A.B., *Haverford College*, 1902, *Peter White
 Fellow in American History*, 1905-1906

American History; Political Science; Philosophy

Thesis, The Composition of the Provincial Lower House: A
 study in the Distribution of Representation in the Colonial
 Assemblies

William D. Henderson, A.B., 1903, A.M., 1904

Physics; Electro-chemistry; Mathematics

Thesis, The Thermo-electric Behavior of Silver in a Thermo-
 element of the First Class

Rufus Percival Hibbard, A.B., *Williams College*, 1899, *Dexter M.
 Ferry Fellow in Botany*, 1905-1906

Botany; Morphology of Algae; Zoology

Thesis, Influence of Tension on the Formation of Mechanical
 Tissue in Plants

Frank Burr Marsh, A.B., 1902

European History; Political Institutions; Sociology

Thesis, English Rule in Gascony (1199-1259), with special ref-
 erence to the Townspeople and Merchants

Howard Daniel Minchin, B.S., 1899, A.M., 1904

Physics; Physical Chemistry; Mathematics

Thesis, On the Coefficient of Expansion of Fused Quartz

Alexander Grant Ruthven, B.S., *Morningside College*, 1903

Zoology; Physiological Zoology; Glacial Ecology

Thesis, Genetic Relationships among the Garter Snakes

John Frederick Shepard, B.S., *Saint Lawrence University*, 1901

Psychology; Neurology; History of Philosophy

Thesis, Organic Changes and Feeling

Robert Hall Tripp, A.B., 1861, was given the degree of Doctor of
 Philosophy as of the Class of 1878

John Garrett Winter, A.B., *Hope College*, 1901, A.M., 1904, *Buhl
 Classical Fellow*, 1905-1906

Latin; Greek; Ancient Philosophy

Thesis, The Myth of Hercules in Rome

Laura Bayne Woodruff, A.B., 1895, A.M., 1899, *Buhl Classical Fel-
 low*, 1905-1906

Latin; Greek Archaeology; Ancient Philosophy

Thesis, Reminiscences of Ennius in Silius Italicus

HOLDERS OF FELLOWSHIPS, 1906-1907

- Ellen Botsford Bach, A.M., *Angeline Bradford Whittier Fellow in Botany*
 John Serenus Bordner, A.B., *Dexter M. Ferry Fellow in Botany*
 Orma Fitch Butler, A.M., *Newberry Classical Fellow*
 Lucius Walter Elder, A.B., *George S. Morris Fellow in Philosophy*
 Allen Marshall Kline, A.M., *Peter White Fellow in American History*
 Rudolf Ernest Knapp,¹ B.S., *Rockefeller Fellow in Hygiene and Bacteriology*
 Dale Livingstone, A.M., *Buhl Classical Fellow*
 Frederic Edwin Park,² B.S. (Ch.E.), *Gas Engineering Fellow*
 George Byron Roth,³ A.B., *Parke, Davis and Company Fellow in Chemistry*
 Adolph Marius Rovelstad, A.M., *Buhl Classical Fellow*
 Frank Van Vliet, A.B., *George S. Morris Fellow in Philosophy*
 Lewis Eugene Warren,⁴ Ph.C., *Stearns Fellow in Pharmaceutical Chemistry*

STUDENTS IN THE GRADUATE SCHOOL 1906-1907

- Joseph Emanuel Alexander Alexis, A.B.,
Augustana College, 1905, A. M., 1906 Whitehall
 Hebrew and Cognates; Hellenistic Greek; Semitic History
 Herbert Francis Allen, A.B., *University*
of S. Dakota, 1905, A.M., ibid., 1906 Vermillion, S. Dak.
 English Literature; Rhetoric; German Literature
 *Frank Eugene Andrews, B.S., 1900, A.M.,
 1906 *Ann Arbor*
 Physics; Physical Chemistry; Mathematics
 Pearl Katheryn Archer, A.B., 1904 *Battle Creek*
 German Literature; Germanic Philology; Latin
 *Edith Emma Atkins, A.B., 1890 *Lansing*
 Latin; Roman Political Institutions; Greek
 Ellen Botsford Bach, A.B., 1901, A.M.,
 1903, *Angeline Bradford Whittier*
Fellow in Botany Ann Arbor
 Botany; Plant Physiology; Vertebrate Zoology
 Benjamin Franklin Bailey, B.S. (E.E.),
 1898, A.M., 1900 *Ann Arbor*
 Physics; Electrical Engineering; Mathematics

¹ Registered in the Department of Medicine.

² Registered in the Department of Engineering.

³ Registered in the Department of Medicine.

⁴ Registered in the Department of Pharmacy.

¹ The subjects of study pursued by candidates for an advanced degree are indicated under their respective names, the subject first named being the major study. An asterisk (*) preceding a student's name indicates that he was enrolled in the Summer Session of 1906 only. A dagger (†) preceding a student's name indicates that he was enrolled in both the Summer Session of 1906 and in the regular academic session of 1906-1907.

-
- Florence Bernice Barnes, A.B., 1904 *Battle Creek*
 Psychology; German Literature; Pedagogy
- Emma Amanda Barry, A.B., *Albion College*, 1904 *Albion*
 Sociology; Philosophy; English Literature
- *Ezra Baumann, A.B., 1906 *North Amherst, O.*
 German Literature; Germanic Philology; English Literature
- Arthur Granville Beach, A.B., *Marietta College*, 1891, B.D., *Yale Divinity School*, 1896 *Ypsilanti*
Cripple Creek, Colo.
- *George Nelson Bentley, B.L., 1900
 English Literature; Rhetoric; Education
- John Knight Munro Berry, A.B., 1901, A.M., 1902 *Detroit*
 German Literature; Germanic Philology; Latin
- Zella Slater Bissell, A.B., 1905 *Detroit*
- John Serenus Bordner, A.B., *University of Indiana*, 1904, *Dexter M. Ferry Fellow in Botany* *Bristol, Ind.*
 Botany; Forestry; Analytical Chemistry
- Oswald Frederic Boucke, A.B., 1905, A.M., 1906 *Bremerhaven, Germany*
 English History; European History; Sociology
- Lawrence Ray Boyer, A.B., 1906 *Niles*
 Physics; Mathematics; Astronomy
- Harold Prell Breitenbach, A.B., 1901, A.M., 1903 *Detroit*
 Rhetoric; English Literature; Aesthetics
- Ora June Brookover, A.B., *Wittenberg College*, 1899 *North Manchester, Ind.*
 Latin; Roman Political Institutions; German
- *Cornelius James Brosnan, A.B., 1905 *Dowagiac*
 European History; English Literature; Education
- Asa L. Brower, B.S., *Morningside College*, 1906 *Sioux City, Ia.*
 Forest Management; Silviculture; Forest Mensuration
- John R. Brumm, A.B., 1904, A.M., 1906 *Nashville*
 Rhetoric; English Literature; Aesthetics
- Warren David Brush, B.S., *Baldwin University*, 1905, A.M., 1906 *Berea, O.*
 Botany; Plant Ecology; Zoology
- Orma Fitch Butler, A.B., 1897, A.M., 1901, *Newberry Classical Fellow* *Ann Arbor*
 Latin; Roman Law; Greek
- *Mollie Drew Butts, A.B., 1903, A.M., 1904 *Lansing*
 Latin; Greek; Classical Archaeology
- *James Andrew Campbell, A.B., 1901, A.M., 1906 *Lawrence, Kan.*
- *Rose Mary Cassidy, B.S., 1900 *Salt Lake City, Utah*
 Animal Physiology; Plant Ecology; Physiological Zoology
- M. Pearl Cessna, Ph.B., *Iowa College*, 1906 *Grinnell, Ia.*

- Alta Jane Chaney, A.B., *Ohio State University*, 1906
English Literature; Rhetoric; Spanish
Columbus, O.
- Herbert Watson Clark, A.B., 1905, A.M., 1906
European History; English History; Jurisprudence
Ann Arbor
- †Walter Francis Colby, A.B., 1901
Physics; Mathematics; Music
Ann Arbor
- Harry Newton Cole, A.B., 1901, B.S. (Ch.E.), 1906
Metallurgy; Physics; Chemical Technology
Ann Arbor
- Erma Ethel Cooper, A.B., *Albion College*, 1899
English Literature; Botany; Economics
Grass Lake
- Mary Jaen Corbett, A.B., *Hillsdale College*, 1902
English Literature; Aesthetics; German
North Adams
- Maude Belle Corbett, A.B., *Hillsdale College*, 1902
English Literature; American History; European History
North Adams
- *Mary Belle Cox, A.B., 1904
Modern European History; American History; English Literature
Huntington, Ind.
- Etta Mabel Crilly, B.S., *Denison University*, 1902
Zoology; Botany; German
Newark, O.
- *Albert R. Crittenden, A.B., 1894, A.M., 1902
Latin; Philosophy; Pedagogy
Olivet
- Rebecca Louise Crittenden, A.B., 1906
American History; European History; German
Mt. Clemens
- Mayme Rose Curtis, A.B., 1905
Zoology; Botany; Psychology
Mason
- Calvin Olin Davis, A.B., 1895, A.M., 1904
History of Education; Theory of Education; History of Modern Philosophy
Ann Arbor
- *Walter Wiley Davis, A.B., *Ohio Wesleyan University*, 1903
Physics; Analytical Chemistry; Mathematics
Kingston, O.
- †Helen Margaret Dudley, A.B., 1906
German; Aesthetics; English Literature
Morrow, O.
- †Fred Sylvester Dunham, A.B., 1906
Latin; Roman Political Institutions; Ancient Philosophy
North Creek, N. Y.
- Lucius Walter Elder, A.B., 1905, *George S. Morris Fellow in Philosophy*
History of Modern Philosophy; Metaphysics; Religion of the Semites
Ann Arbor
- Alvin Eleazar Evans, A.B., *Cotner University*, 1896, A.M., *University of Nebraska*, 1898
Latin; Roman Law; Greek
Bethany, Neb.
- *John Phelps Everett, A.B., 1901
History of Education; History of Philosophy; Psychology
Mt. Clemens
- Cousie Fox, A.B., 1905
Rockford, Ill.
- Leo Morris Franklin, B.L., *University of Cincinnati*, 1892
Sociology; Philosophy of Religion; Ethics
Detroit

- *Edward Everett Gallup, A.B., 1906 *Chelsea*
History of Education; Psychology; Sociology
- Mary Berenice Gallup, A.B., *Wellesley*
College, 1905 *Marshall*
English Literature; English History; Oratory
- Henry Mills Gelston, A.B., 1900 *Ann Arbor*
Latin; Greek; Ancient Philosophy
- Maude Gilchrist, B.S., *Iowa State Normal School*, 1880 *Agricultural College*
Plant Physiology; Plant Ecology; Theory of Education
- *Minnie Almira Graham, A.B., *Mount Holyoke College*, 1900 *Lockport, N. Y.*
Physical Chemistry; Organic Chemistry; Mineralogy
- Alexander Charles Gray, A.B., *University of Toronto*, 1896, A.M., *Hiram College*, 1897 *Ann Arbor*
- Laurence Hadley, B.S., *Earlham College*, 1902 *Danville, Ind.*
Mathematics; Astronomy; Physics
- Herbert Aaron Hard, B.S., *Ohio Wesleyan University*, 1897 *Ann Arbor*
Physical Chemistry; Quantitative Chemistry; Physiography
- Charles Edward Hill, A.B., 1906 *Ellsworth, Ia.*
European History; English History; Economics
- *Winifred Alice Hubbell, A.B., 1899 *Saginaw*
Latin; Roman Political Institutions; American History
- Henry Huizinga, A.B., *Hope College*, 1893, A.M., *ibid.*, 1896 *Ongole, India*
Theory of Education; English Literature; Sanskrit
- *Carolyn Alberta Humphrey, A.B., 1901 *Adrian*
German; French; Italian
- *Wilbur Fisk Jackman, B.S., 1886, Ph.C., 1887 *Orono, Me.*
Mineralogy; English Literature; Physical Chemistry
- *Myron Delos Jerome, A.B., 1906 *Ewart*
- Paul Van Brunt Jones, A.B., 1906 *Ann Arbor*
European History; English History; English Literature
- Homer Walker Josselyn, A.B., 1905 *Detroit*
American History; English History; Political Economy
- Calvin Henry Kauffman, A.B., *Harvard University*, 1896 *Lebanon, Pa.*
Plant Physiology; Mycology; Organic Chemistry
- *Louis Ward Keeler, Ph.B., 1900 *Michigan City, Ind.*
History of Education; Psychology; History of Philosophy
- Flora Melinda Kempf, A.B., *Albion College*, 1901 *Chelsea*
Latin; Roman Political Institutions; German
- Alexander Howard Kennedy, A.B., *Queen's University (Kingston, Ont.)*, 1903 *Ann Arbor*
Philosophy of Religion; Ethics; Hebrew
- Herbert Alden Kenyon, A.B., *Brown University*, 1904, A.M., *ibid.*, 1905 *Ann Arbor*
Romance Literature; Romance Philology; English Literature

- Peter Keplinger, Ph.B., *Colorado College*,
1904 *Colorado Springs, Col.*
Forest Management; Silviculture; Forest Mensuration
- Julius Frank Kimmel, A.B., 1906 *Milwaukee, Wis.*
Forest Management; Silviculture; Forest Mensuration
- *Edith Wilmer Kinnan, A.B., 1904 *Ann Arbor*
History and Philosophy of Education; Psychology; Physics
- *Marjorie Kinnan, A.B., 1904 *Ann Arbor*
History and Philosophy of Education; Psychology; Physics
- *William Gifford Kirby, A.B., 1906 *Galesburg*
- Allen Marshall Kline, A.B., 1903, A.M.,
1904, *Peter White Fellow in American History* *Elsie*
American History; European History; Political Science
- Lenore Lydia Latzer, A.B., 1906 *Highland, Ill.*
Bacteriology; Analytical Chemistry; Botany
- Edward Henry Lauer, A.B., 1906 *Peru, Ill.*
- Mary Louisa Lepper, A.B., *Butler College*,
1895 *Kendallville, Ind.*
Latin; Roman Political Institutions; German
- †George Allan Lindsay, A.B., 1905 *Detroit*
Physics; Mathematics; Astronomy
- Dale Livingstone, A.B., 1896, A.M., 1904,
Buhl Classical Fellow *Ann Arbor*
Latin; Greek Archaeology; Ancient Philosophy
- Clyde Elton Love, A.B., 1905 *Ann Arbor*
Mathematics; Structural Mechanics; Strength and Resistance of
Materials
- *Lily Virginia Lyon, A.B., 1903 *New York City, N. Y.*
Latin; Roman Political Institutions; English Literature
- *Peter F. McCormick, A.B., 1906 *Ann Arbor*
Pedagogy; German Literature; Germanic Philology
- *Lester Angus McDiarmid, B.S., 1900 *Albion*
Mathematics; Astronomy (both minors)
- Nelson Ferris Macduff, A.B., 1905 *Jackson*
Forest Management; Silviculture; Forest Mensuration
- Harold Bateman McKale, A.B., *Albion College*, 1904 *Lansing*
Government; Education; American History
- Otto Charles Marckwardt, A.B., 1901,
A.M., 1902 *Grand Rapids*
Rhetoric; Aesthetics; English Literature
- Frank John Mellencamp, A.B., 1903, A.M.,
1906 *Ann Arbor*
Physics; Physical Chemistry; Mathematics
- Frederick Jacob Menger, Jr., A.M., *Western Reserve University*, 1902 *Ann Arbor*
German Literature; Germanic Philology; English Literature
- *Howard Daniel Minchin, B.S., 1899,
A.M., 1904 *Rochester, N. Y.*
Physics; Physical Chemistry; Mathematics
- Josephine Claire Mirfield, A.B., *Augustana College*, 1906 *Rock Island, Ill.*
English Literature; American History; History of Education

- †Jacob Moyer, A.B., *Greenville College*,
1901 *Spring Arbor*
Analytical Chemistry; Physical Chemistry; Mineralogy
- *Margaret Parthenia Murrell, A.B., 1902 *Decatur, Ill.*
Latin; English Literature; Aesthetics
- *Frances Elizabeth Nichols, A.B., *Middlebury College*, 1900, A.M., 1905 *Sudbury, Vermont*
- †Frederick Arthur Osborn, Ph.B., 1896 *Seattle, Wash.*
Physics; Physical Chemistry; Crystallography
- Robert Washington Goldsborough Owen,
A.B., 1906 *Atlanta, Ga.*
Bacteriology; Hygiene; Physiological Chemistry
- Carl Eugene Parry, A.B., 1905 *Ann Arbor*
Political Economy; Sociology; History
- Carl Stafford Patton, A.B., *Oberlin College*, 1888 *Ann Arbor*
Hebrew; Hellenistic Greek; Philosophy
- John Arthur Peters, A.B., 1892, A.M., *Harvard University*, 1898 *Detroit*
Greek; Latin; Ancient Philosophy
- Clyde Edwin Pickett, A.B., *Hiram College*, 1901 *Shepherd*
- *Homer Elmer Robbins, A.B., 1905, A.M., 1906 *Ann Arbor*
Latin; Greek; Sanskrit
- Adolph Marius Rovelstad, A.B., *St. Olaf College*, 1903, A.M., 1906, *Buhl Classical Fellow* *Elgin, Ill.*
Latin; Greek; Ancient Philosophy
- Hideo Sakuma, A.M., 1905 *Tango, Japan*
Finance; Political Economy; Municipal Administration
- *Ernst Schmitz, A.B., 1905 *Detroit*
German; English Literature; American History
- †Irving Day Scott, A.B., *Oberlin College*, 1900 *Syracuse, N. Y.*
Mineralogy; Chemistry; Geology
- *Rufus Clark Shellenbarger, A.B., 1903 *Yankton, S. Dak.*
Physics; Mathematics; Education
- Charles Everett Skinner, B.L., 1896 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Robert Earle Snyder, A.B., 1905 *Marquette*
Physics; Chemistry; Mathematics
- Arthur William Stalker, A.B., 1884 *Ann Arbor*
Aesthetics; Ethics; English Literature
- Manson Alexander Stewart, A.B., 1903, A.M., 1904 *Elba*
Latin; Greek; Ancient Philosophy
- *Grace Alma Strang, A.B., 1901 *Ypsilanti*
German Literature; Germanic Philology; Latin
- Rolland Arthur Stretch, A.B., 1906 *Ann Arbor*
Forest Management; Silviculture; Forest Mensuration
- *James Wellings Sturgis, A.B., 1896, A.M., 1897 *Norman, Okla.*
Latin; Greek; Ancient Philosophy

- *Alice Kerr Sturm, A.B., 1902 *Saline*
 Latin; Roman Political Institutions; English Literature
- Joseph Luther Thalman, A.B., *Ohio Wesleyan University*, 1900 *Ann Arbor*
 Botany; Plant Ecology; German Literature
- †Harry Conrad Thurnau, A.B., 1899, A.M., 1903 *Ann Arbor*
 German Literature; Germanic Philology; English Literature
- Ole Tønning, A.B., *Luther College*, 1904, A.M., 1906 *Decorah, Ia.*
 German Literature; Germanic Philology; European History
- Donald Dexter Van Slyke, A.B., 1905 *Geneva, N. Y.*
 Organic Chemistry; Plant Physiology; Bacteriology
- Frank Van Vliet, A.B., 1902, *George S. Morris Fellow in Philosophy* *Ann Arbor*
 History of Philosophy; Metaphysics; Mathematics
- *Dwight Everett Watkins, A.B., 1901 *Ithaca*
 Elocution; English Literature; Rhetoric
- *Edwin Oscar Weaver, A.B., *Wittenberg College*, 1889, A.M., *ibid.*, 1891 *Springfield, O.*
 Physics (major and one minor); Mathematics
- Frederick William Weck, A.B., *University of Indiana*, 1905 *Urbana, Ind.*
 German Literature; Germanic Philology; English Literature
- *Francis Everett West, B.S., *Michigan Agricultural College*, 1899, M.S., *ibid.*, 1902 *Alma*
 Organic Chemistry; Botany; Plant Physiology
- Chester Nathan Whitney, Ph.B., *Sheffield Scientific School*, 1905 *Georgetown, Mass.*
 Forest Management; Silviculture; Forest Mensuration
- Levi Philip Ray Willoughby, A.B., 1900 *Detroit*
- *John E. Winter, A.B., 1906 *Holland*
 Psychology; Philosophy; Education
- Herbert Hollingsworth Woodrow, A.B., 1904 *Ann Arbor*
 Psychology; Neurology; Physiology
- Nellie Leila Wortman, A.B., *Olivet College*, 1901 *Ionia*
 Latin; Roman Political Institutions; Greek Art
- Oscar Herman Wurster, A.B., 1905, M.S., 1906 *Ann Arbor*
 Physical Chemistry; Physics; Mineralogy
- Veda Rosabelle Wykoff, A.B., 1904 *Ann Arbor*
- John Zedler, A.B., *Albion College*, 1903 *Albion*
 German Literature; Germanic Philology; English Literature
- *Marie Zimmerman, A.B., 1906 *Port Huron*
 German Literature; Germanic Philology; Aesthetics
- Karl Wilhelmj Zimmerschied, A.B., 1903, M.S., 1904 *Ann Arbor*
 Metallurgy; Analytical Chemistry; Commerce

The following students, enrolled in the Graduate School, were Permitted to complete a portion of their studies *in absentia*:

Mary Belle Cox, A.B., 1904	<i>Huntington, Ind.</i>
Modern European History; American History; English Literature	
Marguerite Gibson, B.L., 1900	<i>Paris, France</i>
French; German; Italian	

The following student, enrolled in the Department of Law, was also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

Willard Titus Barbour, A.B., 1905	<i>Ypsilanti</i>
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The following student, enrolled in the Department of Medicine, was also a candidate for an advanced degree in the Department of Literature, Science, and the Arts:

William J. Marshall, A.B., 1905	<i>Ann Arbor</i>
Hygiene; Quantitative Chemistry; Organic Chemistry	

The following students, having completed their undergraduate course at the University at the close of the first semester, 1906, were allowed registration in the Graduate School:

Richard Wilhelm Broecker	<i>Goodrich</i>
German Literature; Germanic Philology; Psychology	
Gail Luke Carver	<i>Climax</i>
Zoology; Mineralogy; Physics	
John R. Davis, Jr.	<i>City of Mexico, Mexico</i>
Anatomy (major and one minor); Hygiene	
Helena Lois Duschak	<i>Buffalo, N. Y.</i>
Latin; Greek; Roman Law	
Esson McDowell Gale	<i>Bay City</i>
Medieval History; English History; English Literature	
Lulu Agatha Liesemer	<i>Ann Arbor</i>
Latin; German Literature; Germanic Philology	
Edwin Lowe Neville	<i>Cleveland, O.</i>
American History; Political Philosophy; Political Economy	
Josephine Ara Nevins	<i>Otsego</i>
Latin; Roman Political Institutions; German	
John Frederick Preston	<i>Higginsville, Mo.</i>
Forest Management; Silviculture; Forest Mensuration	
Mabel Tuomey	<i>Ann Arbor</i>
English Literature; Rhetoric; Aesthetics	
Charles Alexander Vallance	<i>Fowlerville, N. Y.</i>
Analytical Chemistry; Organic Chemistry; Mineralogy	

SUMMARY

HIGHER DEGREES CONFERRED, 1906.

Master of Science (in Forestry).....	5
Master of Science	2
Master of Arts	32
Doctor of Philosophy	13
	<hr/>
Total	52

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	<hr/>
Total	149

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THE UNIVERSITY BULLETIN IS ISSUED BY THE UNIVERSITY OF MICHIGAN AS OFTEN AS ONCE A MONTH DURING THE UNIVERSITY YEAR.

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THE BULLETIN INCLUDES THE FOLLOWING PUBLICATIONS:—

The Annual Report of the President.

The Calendar of the University.

The Annual Announcements of the Department of Literature, Science, and the Arts, the Graduate School, the Departments of Engineering, of Medicine and Surgery, and of Law, the School of Pharmacy, the Homœopathic Medical College, the College of Dental Surgery, and the Summer Session.

Other Announcements of the several departments of instruction, Reports of University officers, etc.

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MARCH, 1908

UNIVERSITY OF MICHIGAN

DEPARTMENT OF
LITERATURE, SCIENCE, AND THE ARTS

GRADUATE SCHOOL

Annual Announcement

FOR

1908-1909

AND SUMMER SESSION, 1908

Ann Arbor

PUBLISHED BY THE UNIVERSITY
1908

ADMINISTRATIVE COUNCIL
OF THE
GRADUATE SCHOOL

JAMES B. ANGELL, LL.D., PRESIDENT.

RICHARD HUDSON, LL.D., CHAIRMAN, and *Professor of History.*

WALTER DENNISON, PH.D., SECRETARY, and *Junior Professor of Latin.*

MARTIN L. D'OOGHE, PH.D., LL.D., *Professor of the Greek Language and Literature.*

ISAAC N. DEMMON, LL.D., *Professor of English.*

WOOSTER W. BEMAN, A.M., *Professor of Mathematics.*

HENRY S. CARHART, LL.D., *Professor of Physics.*

ROBERT M. WENLEY, Sc.D., LL.D., *Professor of Philosophy.*

MAX WINKLER, PH.D., *Professor of the German Language and Literature.*

ALLEN S. WHITNEY, A.B., *Professor of Education.*

FRED M. TAYLOR, PH.D., *Professor of Political Economy and Finance.*

FREDERICK C. NEWCOMBE, PH.D., *Professor of Botany.*

CALENDAR

1908.

June	18	Commencement.
June	22	Summer Session begins.
Aug.	14	End of Summer Session.
Sept.	29	First Semester begins in all Departments of the University.
Nov.	26	Thanksgiving Day. Holiday.
Dec.	22	(Evening) Christmas Vacation begins in all Departments.

1909

Jan.	4	Exercises resumed.
Feb.	5	End of First Semester.
Feb.	8	Second Semester begins.
April	9	(Evening) Recess begins, ending April 19 (evening).
May	30	Memorial Day. Holiday.
June	24	Commencement.
June	28	Summer Session begins.
Aug.	20	End of Summer Session.

ANNOUNCEMENT OF THE GRADUATE SCHOOL

GENERAL INFORMATION

The University of Michigan

The University of Michigan is a part of the public educational system of the State. The governing body of the institution is a Board of Regents, elected by popular vote for terms of eight years, as provided in the Constitution of the State. In accordance with the law of the State, the University aims to complete and crown the work that is begun in the public schools, by furnishing ample facilities for liberal education in literature, science, and the arts, and for thorough professional study of engineering, medicine, law, pharmacy, and dentistry. Through the aid that has been received from the United States and from the State, it is enabled to offer its privileges, with only moderate charges, to all persons of either sex, who are qualified for admission. In the several faculties there were in 1907-1908, about 350 officers of instruction. Including the enrollment of the Summer Session, about 5,000 students, representing 50 States and Territories, and 18 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1907-1908, about 150, including assistants. The students in attendance numbered about 1,800, of whom about 125 were graduates. The presence of such a number of graduate students, together with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Graduate School

The first graduate student at the University is recorded in the catalogue of 1856. The degrees of Master of Arts and of Master of Science were earliest conferred, the degree of Doctor of Philosophy being offered for the first time in 1875. Changes made in studies in 1877-1878 had an important bearing on graduate work at the University. This was due to the multiplication of electives and the introduction of the credit system. The seminary method of instruction began then to assume considerable proportions, and the movement was helped along by a growing demand for better trained teachers.

In the spring of 1892 the Graduate School was organized in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department, and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of higher work, and, so far as possible, for the separate instruction of graduate students. It lays emphasis, therefore, upon university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council which consists of eleven members of the Faculty of the Literary Department appointed by the President. Application for admission to the School are made to the Secretary of this Council.

ADMISSION AND REGISTRATION

Admission

The privileges of the Graduate School are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School. But admission to study in the School does not imply necessarily admission to candidacy for a degree. The requirements made of candidates for higher degrees may be found on pages 7 to 12.

Graduates of other institutions whose course of study is not substantially equivalent to that prescribed at this University are required to do an additional amount of undergraduate work before being admitted to registration as members of the Graduate School.

For information in regard to enrollment for graduate study in the Summer Session, see page 13.

Registration

All applicants for admission to the Graduate School must present themselves with their credentials to the Secretary of the Administrative Council. Applications for admission to the Graduate School are subject to the approval of the Administrative Council.

In common with all other students applicants must also register in the office of the Secretary of the University, and pay their fees to the Treasurer.

All students of the Graduate School, *whether registered in a previous year or not*, are required to register with the Secretary of the Administrative Council at the beginning of *each year* of residence. *Such registration must be made at the beginning of the year to ensure recognition of meeting the residence requirement.*

Students who are within three hours of completing their undergraduate course at this University, while they may not be registered in the Graduate School, are permitted to count the semester in which they complete their undergraduate requirements as part of the residence requirements for the master's degree, provided they regularly elect and pursue graduate courses under the responsible committee.

Students who finish the undergraduate course of this University at the end of the first semester and who continue their residence for the remainder of the year, are permitted to register in the School and thus secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

Applicants who do not wish to become candidates for a degree, may be admitted and registered as special graduate students. Such graduate students must designate, and have approved, the general lines of study which they wish to pursue.

Students who withdraw from the University during the academic year are requested to inform the Secretary without delay of such withdrawal.

Changes of subjects originally selected must be reported to the Council for approval.

DEGREES

Admission to Candidacy

Admission to candidacy for a higher degree is granted only to Bachelors of this University or of other universities or colleges of similar standing, or to students whose preparation for graduate study is beyond all question fully equivalent to that represented by the undergraduate course of this University. Recognition of candidacy requires the approval of the Administrative Council.

Graduate study for a degree will naturally be along lines in which the candidate has had special preparation.

Except as stated below (pages 8 and 9) one year of residence study is required of all candidates for a degree. Registration should be made and subjects of study announced as early as possible, and *this must be done immediately* at the opening of the academic year in order to ensure meeting the residence requirement.

University System

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. When a choice of studies has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a master's degree.

Applicants for an advanced degree are required to announce to the Council, through the Secretary, *before the end of the first week of the semester*, the particular branches of study to which they wish to give special attention.

Degrees Conferred

The degree conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees—M.A., M.S.

A candidate who has been admitted to study for the master's degree, may be recommended for the degree after one year of resident study at this University, provided he passes a satisfactory examination on the subjects of study approved by the Administrative Council. The work done in residence is mainly in pursuing courses of study regularly announced, but private work is often undertaken under special direction.

The practice of allowing students to enter upon studies *in absentia* as candidates for a master's degree, has been discontinued. But a graduate of this University who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.* Candidates for the master's degree who find it necessary thus to complete a portion of

their work *in absentia* are required to petition the Administrative Council through the Secretary for such privilege, and if their petition is granted, they must keep the Secretary informed of their continued connection with the School and of the progress of their work.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

Candidates for the master's degree may pursue their work under either of the following plans:

A

1. Candidates shall choose a major study, and two minor studies, to each of which approximately one-half of the work necessary for the major shall be devoted. The major and one minor may fall within the same department; but, unless otherwise determined by the Administrative Council, the second minor shall be chosen in another department.

2. Every candidate shall submit his choice of studies to the Administrative Council for approval. This Council shall constitute a court of appeal for any candidate whenever the wisdom of his choice is called in question.

3. At the conclusion of the first semester of study the candidate shall be required to pass an examination (written or oral or both), or to present an essay or piece of research (so far as completed), as the professor in charge of the course may determine.

4. At the close of the course, the committee in charge of the candidate's work shall conduct a final examination, which may be written or oral or both.

NOTE.—It is the intention that candidates pursuing their work on the foregoing plan shall specialize in some field of scholarship or research.

B

1. Candidates shall choose from courses published in the Annual Announcement of the Graduate School not more than 13 hours of work in each semester. These hours may be distributed over as many as three departments in one of which study shall be pursued throughout the entire course.

2. With the permission of the Administrative Council a candidate may choose in addition to the 13 hours of graduate work not more than four hours of undergraduate work in each semester.

3. Every candidate shall submit his choice of studies to the Administrative Council of the Graduate School for approval.

4. The work of candidates shall be under the charge of a committee consisting of the heads of departments in which work is taken.

5. At the end of each semester the candidates shall be required to pass a special examination (oral or written or both) in each

branch of study, as the professor in charge of the course may determine.

6. At the conclusion of the course, the committee in charge of the candidate's work shall designate not less than three examiners, who shall conduct a final examination, in such manner as they may see fit, on all graduate work taken by the candidate.

NOTE.—It is intended that candidates pursuing their course on the foregoing plan shall be at liberty to supplement their baccalaureate work rather than be required to specialize along a single definite line. It is not the primary intention that this year of master's work shall count toward a doctorate, unless the committee of heads of departments in charge of the candidate's work recommend decidedly to the contrary.

The Doctors' Degrees—Ph.D., Sc.D.

The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. This rule may be waived in the case of those who come properly accredited from a graduate school of some other university, and of those, who as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.

It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study. The candidate must also evince ability to carry on independent research. No definite term of required residence can, therefore, be specified. As a rule, three years of graduate study are necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work. Candidates who already hold the master's degree usually find it possible to prepare for the doctor's examination after two years of further study along the same lines of work pursued for the master's degree.

A student wishing to become an applicant for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

No student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research.

A candidate for a doctor's degree must choose a major study that is substantially co-extensive with some one department of instruction in the University. He must also choose two minor studies, one of which may be in the same department as the major, but which involves a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject

to the approval of the Administrative Council. A portion of the work for a doctor's degree consists in pursuing regularly announced courses of instruction, but in general a large amount of time is devoted to individual study and research under the immediate supervision of the committee in charge. This is especially true in the preparation of the thesis.

The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may at their option receive the degree of Doctor of Science.

The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but its acceptance depends more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final résumé of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

The thesis must be completed and a good legible copy must be put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

The thesis must be read and defended in public at such time as the Council may appoint; and, in case of a master's degree, a bound copy, either written or printed, must be deposited in the University library.

Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of this thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. To guarantee the printing of the thesis, he is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his own expense, or shall have it published in a form and under auspices

approved by the responsible committee. The candidate is required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended. The thesis must be bound with cover and title-page, and the latter, in addition to the title and name of the author, must bear the following inscription: A Thesis submitted to the Faculty of the Department of Literature, Science, and the Arts of the University of Michigan for the degree of Doctor of Philosophy (or of Science). A plan of the proposed title-page of the thesis must be submitted to the Librarian of the University for his approval. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

Examinations

The final examinations of candidates for the higher degrees are commonly held during the first two weeks in June, but the examination can usually be arranged at any time when a candidate has fulfilled all the technical requirements and has satisfied his instructors that his work has been such as to warrant an examination.

Ordinarily the examinations are oral, and in each case they are held before those comprising the special committee in charge of the candidate's work and before such others as may be present by invitation of this committee. They may be preceded by such written tests as individual instructors consider necessary.

For information concerning the examination of candidates for the master's degree see pages 9 and 10.

SUMMER SESSION

In departments which offer graduate courses in the Summer Session, graduate students, who are regularly matriculated in the University, may carry on work which will count toward an advanced degree. Graduates of other universities or colleges of similar standing, who are competent to enroll for a higher degree, may matriculate in the University and begin graduate study in the Summer Session. For the matriculation fee, see below, page 13.

Candidates for the master's degree, if graduates of the University of Michigan, may present themselves for examination after attendance upon three Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Candidates for the master's degree, if graduates of other approved institutions, may present themselves for examination after attendance upon five Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Many teachers avail themselves of this opportunity to begin graduate work, and later return to the University to complete the requirements for a higher degree. The number of courses in the Summer Session designed especially for graduates is large and constantly increasing. In many respects the advantages afforded for advanced study are distinctly superior to those enjoyed during the academic year. These advantages are found in the smaller classes, in the freer use of the facilities of libraries, laboratories and museums, but especially in that more direct, intimate and personal contact with the professor in charge which adds so greatly to the satisfaction and efficiency of specialized work.

Graduate courses to be offered in the Summer Session of 1908 are described in this Bulletin following the announcement of courses in each department for the academic year, 1908-1909.

In addition to the courses regularly announced for graduate instruction, it should be noted that all professors giving work during the Summer Session will gladly arrange and direct the work of graduate students competent to enroll for a degree, who may desire to work along special lines for which specific courses have not been provided.

FEES AND EXPENSES

Matriculation Fee.—Every student before entering any department of the University, is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying *in absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or students shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Fee for Summer Session.—The fee for the Summer Session of the Department of Literature, Science, and the Arts, for graduate students who have already matriculated, is fifteen dollars regardless of the number of courses taken.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for materials and apparatus actually consumed by them. The laboratory expenses thus depend upon the student's prudence and economy. Experience has shown that in the chemical laboratory the average expenditure for all courses is about one dollar and twenty cents a week. The deposits required in advance vary with the courses taken, ranging from one to twenty dollars.

Diploma Fee.—The fee for the diploma given on receiving an advanced degree is ten dollars, and a by-law of the Board of Regents prescribes that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Holders of fellowships and of scholarships are required to pay the matriculation fee (if not already paid), the annual fees, the diploma fee, laboratory expenses, and other similar charges, the same as other students of the department in which their work lies.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

THE LIBRARIES

The libraries of the University, comprising the General Library, the Medical Library, the Law Library, the Homœopathic Library, and the Dental Library, contained in the aggregate, June 30, 1907, 222,609 volumes and 5,000 pamphlets. One thousand two hundred and eighty-eight periodicals are regularly received.

The General Library contains 172,940 volumes, 3,800 pamphlets, and 3,370 maps. It includes the following special collections: Parsons Library (political economy), 6,076 volumes; McMillan Shakespeare Library, 6,525 volumes; Goethe Library, 1,121 volumes. The Hagerman Collection and the Dorsch Library, formerly treated as special collections, have, with the approval of the donors, been merged in the general collection. Nine hundred and nine periodicals are taken by the General Library.

Within the last few years the library has been enriched by several valuable gifts. Among the more important of these that deserve

special mention are the historical books, including the Stevens Facsimilies, presented by Mr. Clarence M. Burton, of Detroit; the Morris Philosophical Library, presented by Mrs. George S. Morris; the Alpheus Felch Historical Library, bequeathed by the late Governor Alpheus Felch; the Walter Library of Romance Literature, bequeathed by the late Professor Edward L. Walter; the Stearns Musical Collection, presented by Messrs. Frederick and Frederick K. Stearns, of Detroit; the Germanic Library of the late Professor George A. Hench, presented by his mother, Mrs. Rebecca A. Hench; and the Geological Library of the late Professor Israel C. Russell, presented by his widow.

Officers and students of the University draw books from the library, subject to certain restrictions. Special privileges are granted to graduate students, and separate rooms provided for them where work is pursued with the necessary books at hand. The reading room for general use will seat 270 readers.

The library is open for consultation fourteen hours daily during the academic year, and ten hours daily during the Summer Session, and the summer vacation. On Sundays and important legal holidays the library is closed.

The Law Library, of over 24,425 volumes, is of especial value for graduate work in political science. It contains the statutes and judicial reports of every state and of the United States, and an extensive collection of treaties, text-books and legal periodicals, both American and English. It is housed on the second floor of the Law Building, with an ample reading room.

THE LABORATORIES

Physical Laboratory

The Physical Laboratory has recently been greatly enlarged by the addition of a new lecture room and increased space for laboratory work. This enlargement permits the department to devote the smaller rooms to advanced and graduate work. Hereafter work in electrochemistry, sound and light, heat, and electrical measurements will be conducted in separate suites of rooms, and special provision will be made for graduate students. In fact important researches for graduate theses will have separate rooms set aside for their accommodation. The apparatus for the advanced courses is already extensive, and additions are made every year to meet the needs of graduate students.

Chemical Laboratory

The Chemical Laboratory has a floor space of over fifty thousand square feet. About fifty courses are offered during the college year, most of which involve laboratory work. The building contains a reading room in which are shelved the most frequently required reference books and a few duplicate sets of chemical journals. The

main portion of the Chemical Library is readily accessible in the adjacent library building, and is especially valuable to the research student because of its complete sets of forty-nine journals devoted wholly or in large degree to Chemistry.

In addition to a full supply of routine materials and apparatus for work in General, Analytical, Organic, Physical, Pharmaceutical and Technological Chemistry, facilities are offered for advanced study and research along many lines, including apparatus for the preparation of raw materials, a continuous extraction apparatus, a hydraulic press capable of exerting a pressure of five thousand pounds per square inch, a filter press and a power-driven centrifugal machine. Direct current is available at various voltages from storage batteries, rotary transformers, and a 220-volt power plant for electrochemical or electrothermal work. Advanced students have also at their disposal various types of resistance, resistor and arc furnaces, as well as oil and gas fired furnaces for high temperature work, and both electrical and optical pyrometers. Special facilities are provided for the preparation of microscopic or photomicrographic examination of specimens either in thick polished section by vertical illumination or in thin section by either plane or polarized light. Five ventilated dark rooms provide for spectroscopic, photometric, and photographic work and experiments in refraction. Sixty analytical balances are distributed in four balance rooms and in private laboratories, and others for heavier loads or of greater delicacy are reserved for special purposes.

Geological Laboratory

In December of 1907 the Regents of the University made provision for a laboratory room for Geology, which has since been completed on the first floor of the north wing of the Museum building. This laboratory is provided with tables and chairs to accommodate sections of fifty students. Immediately adjacent to it are extensive collections of rocks, ores, and fossils.

The Russell Library and Seminary Room in the same building contains the private library of the late Professor Israel C. Russell, now donated to the department, with the important geological and geographical journals, and the geological survey reports expanded and continued. The Library is also equipped with wall maps, geographical models, topographical and geological atlases, and a large collection of special maps. In addition to its use as a departmental library and seminary room it is at special hours available for small classes and for laboratory work in geography, for which purpose it has been supplied with a projecting lantern. Advanced students are assigned private lock-drawers and regular sittings at the reading tables.

For the study of earthquakes, the University has purchased a large collection of modern seismographs. These instruments will be installed in the astronomical observatory, but will be available for inspection and study by suitably qualified students. See page 17.

The Astronomical Observatory

The University Observatory was founded in 1852, through the liberality of citizens of Detroit, and on this account it was named Detroit Observatory. It is situated on the northeastern border of the city of Ann Arbor, about half a mile from the University Campus. Its principal instruments are a refracting telescope of twelve and one-fourth inches clear aperture, originally constructed by Henry Fitz of New York, but largely rebuilt in 1906-7 in the Observatory Instrument Shop; and a six-inch meridian circle, made by Pistor and Martins of Berlin in 1854. It has also a six-inch equatorial telescope, with objective by Alvan Clark & Sons and mounting by Fauth & Company; a three-inch meridian transit, with zenith telescope attachment, by Fauth & Company; a four-inch comet seeker; mean and sidereal clocks by Tiede and Howard respectively; alt-azimuth instrument by Wurdemann; theodolite by Brandis; chronometers, chronograph, sextants, etc.

The meridian circle and larger equatorial are installed in the main Observatory building, the west wing of which contains the Observatory library and connects with the residence of the Director. These larger instruments are intended primarily for research, and will be available to that end for such students as have the technical ability to use them to advantage.

The smaller refractor and the meridian transit are mounted in a small observatory near the main building, and are used principally for instruction.

A shop supplied with excellent hand and machine tools is maintained on the grounds for the repair and construction of instruments. The additions made in this shop have added materially to the effectiveness of the equipment for instruction and research.

The large reflecting telescope is being constructed for the Observatory and it is expected that it will be ready for erection during the summer of 1908. The optical parts of this instrument have been completed by the John A. Brashear Company of Allegheny. The large mirror has an outside diameter of $37\frac{5}{8}$ inches, and the diameter of the silvered surface is $37\frac{3}{8}$ inches. This instrument will be mounted equatorially, and may be used either as a Newtonian or as a Cassegrain telescope. It is designed especially for photographic and spectroscopic work, and a stellar spectroscope for use with it is being made by the John A. Brashear Company.

The Observatory has ordered and will soon receive a very complete set of modern seismographs, for the registration of near and distant earthquake shocks. These include instruments of the Bosch-Omori and the Wiechert types, with mechanical registration of the vertical and two horizontal components of the motion.

For many years the Observatory has been receiving the principal astronomical publications and its technical library is reasonably complete, including in round numbers about 2,500 volumes. These

include nearly all the printed star catalogues, most of the modern publications of observatories and astronomical societies, and nearly complete files of the astronomical periodicals.

Mineralogical Laboratory

This laboratory occupies ten rooms in the basement of Tappan Hall and has a total area of over 6,000 square feet. One large room is used for general laboratory purposes, another is devoted to blow-pipe methods and chemical crystallography, while a third is used for petrography, crystal measurements and drawing. Another large room contains the display and study collection of minerals. The collections of the laboratory are extensive and comprise over 40,000 specimens; for a description of these see page 21. There is also a well appointed lecture room in direct connection with the general laboratory and mineral collections. Four small dark rooms are used for goniometric and optical investigations.

The general laboratory is well equipped with crystal models, natural crystals, and working collections for the rapid determination of minerals, principally by means of the physical properties. The laboratory is also equipped with goniometers, polarization microscopes, and other crystallographic-optical instruments necessary for a thorough study of crystals. These instruments are of the most modern and approved types. The laboratory also possesses good lecture and working collections of rocks and thin sections. The blow-pipe laboratory possesses ample facilities for carrying on blowpipe tests, both upon plaster tablets and charcoal, as well as other chemical tests useful in the determination of minerals.

Special attention is given to graduate and research work in crystal measurement, chemical crystallography, and general mineralogy.

Zoological Laboratory

The Zoological Laboratory of twenty rooms occupies the second and third stories of the south wing of University Hall. In addition to rooms for general class and laboratory work, there are private rooms for members of the teaching staff and for assistants and research students. Each of these rooms accommodates from one to three persons and research students may thus work free from the disturbances incident to a large laboratory. All rooms are provided with gas, electricity and running water and are fitted with special tables.

In addition to the usual apparatus (microscopes, microtomes, imbedding and reconstructing apparatus) graduate students will find an ample supply of glassware and chemicals and of the minor laboratory conveniences. All these are systematically arranged and catalogued and are made freely accessible, so that the research worker is saved unnecessary delay.

A photographic room and dark room are a part of the laboratory.

They are equipped for all classes of scientific photography, by means of either vertical or horizontal camera, with or without the microscope. There is also apparatus for outdoor photography.

A good working library of the more important zoological journals in all languages, as well as of separate publications, is shelved in a separate room in the laboratory. In addition much zoological literature is to be found in the General Library and in the library of the Medical Department. A set of the zoological cards of the Concilium Bibliographicum since its foundation is most conveniently arranged and kept sorted up to date in the General Library.

A special effort is made to facilitate the study of living animals. For this purpose there is a small vivarium fitted with cases suitable for terrestrial and amphibious animals. There are sixteen large, glass and slate aquaria, one of them seven feet long. There are arrangements for maintaining thirty still smaller aquaria with running water for the study of developmental stages and isolated forms. For field work there is a good equipment of collecting apparatus in sets for individual use and a supply of the larger apparatus for joint use.

Botanical Laboratory

The Botanical Laboratory is well equipped for advanced students for the study of morphology, physiology, and ecology. Means are at hand for embedding in paraffin and collodin, for microtome sectioning, and for staining. Culture media and apparatus, sterilizing ovens and cabinets with adequate collections and literature, offer means for research with bacteria and fungi. Chemical and physiological apparatus, klinostats, centrifuges, constant temperature rooms, dark rooms, aquaria, and plant houses afford facilities for research in physiology. The University Botanic Garden affords ample space for outdoor culture. The location of the University gives easy and immediate access to a varied flora of a diversified topography, including the plains of the old Lake Erie bottom, and the hills, valleys, bogs, lakes, and rivers of the terminal moraine of the glacial drift.

Forestry Laboratory

In the Forestry Laboratory students receive instruction in forest botany, timber physics, structure of woods, and certain features of wood technology, as well as in forest measurements and the methods of study of the growth of timber. A good collection of wood specimens, sections of trees, and herbarium material is provided and will be increased as rapidly as possible. There is an ample supply of microscopes, compasses, calipers, height measures, and other apparatus for use in the laboratory and in the field.

Special facilities for the study of forestry are supplied by the Saginaw Forest Farm, a tract of land about one mile west of the city of Ann Arbor, presented to the University by the Honorable Arthur Hill, of Saginaw.

The farm, comprising eighty acres, is to serve as an object lesson in forestry. Upon it provision is to be made for (1) an arboretum of all useful forest trees that can grow in Michigan; (2) demonstrative areas for seed-bed and nursery work; (3) model plantations of forest trees; and (4) special experiments in forestry, relating to various methods of propagating different kinds of timber, to the raising of particular forest products, and to other practical purposes.

Psychological Laboratory

The Psychological Laboratory occupies fourteen rooms, including two dark-rooms. All are connected by wires with a central switchboard, and can be supplied with low potential currents from a central plant and connected in pairs for chronometric work. Power is provided by electric motors.

The apparatus includes all the more important standard instruments and many specially devised for researches that have been carried on in the laboratory. The equipment for work in sound and for studying the relations between the psychological processes and mental states is particularly large, but every field is represented. Among the instruments may be mentioned kymographs by Zimmermann, Hipp chromoscopes, the ton variator of Stern with the Whipple gasometer bellows, a complete set of Verdin's instruments for investigating speech, forks of König and Edelmann, and a modified Wien apparatus by Kohl for determination of sound intensities.

Special apparatus for research work will be procured, or constructed, as may be desired by individual students doing advanced work.

Statistical Laboratory

This laboratory is equipped with various instruments to facilitate the computation and tabulation of statistics. Students are instructed in the preparation and tabulation of premiums, reserves, and other schedules required in the practical work of insurance offices and statistical bureaus. The laboratory also contains a working library comprising most of the important actuarial journals and text books on actuarial theory.

THE MUSEUMS AND OTHER COLLECTIONS

University Museum

The University Museum contains collections illustrative of geology (the mineral collection for convenience of instruction in mineralogy, being cared for in Tappan Hall), of zoology, and of anthropology. Special collections in botany, materia medica, chemistry, anatomy, and the industrial arts are deposited in the various buildings devoted to the subjects they illustrate. All of these are accessible to students.

The following descriptions indicate the character of some of the collections included in the University Museum.

I. THE GEOLOGICAL COLLECTIONS consist of:—

a. The large series of lithological and palæontological specimens brought together by the State geological survey, of which over a hundred fossil species have become the types of original descriptions.

b. The White Collection, consisting of 1,018 distinct entries, 6,000 specimens, of invertebrate fossils.

c. The Rominger Collection, embracing about 5,000 species of invertebrate fossils, represented by at least 25,000 specimens.

d. Smithsonian Deposits, consisting, for the present, of a collection of specimens of foreign and domestic building stones, and specimens of fossils from the Upper Missouri.

e. Miscellaneous Donations, Collections, and Purchases, including a series illustrative of the metalliferous regions of the Upper Peninsula, collected by the late Professor Alexander Winchell; an interesting collection of fossils, chiefly Cretaceous, from the Yellowstone Valley, presented by the late General Custer, U. S. A.; and a series of six to eight hundred rock species and varieties from the Drift of Ann Arbor, collected, dressed to standard size and form, and presented by the late Miss Eliza J. Patterson. A collection of 150 specimens of ores and rocks has recently been presented by the United States National Museum.

The entire collection, the larger portion of which consists of invertebrate fossils, is estimated to contain approximately 17,000 entries and about 60,000 specimens.

II. THE MINERALOGICAL AND PETROGRAPHICAL COLLECTIONS.

The mineral collections comprise more than 40,000 specimens. For instructional purposes several large collections have been arranged. These are (*a*) a large display and study collection, (*b*) an unlabeled collection for use in determinative mineralogy, (*c*) a lecture collection of about 2,500 specimens, and (*d*) a blowpipe collection. The minerals of the Lake Superior mining region are well represented by large suites.

The petrographical collections contain several thousand specimens and consist of (*a*) a systematic labeled collection for lecture and study purposes. Many of the specimens of this collection were brought together by the older State Geological Survey. This collection is accompanied by a large number of thin sections. (*b*) There is also a good collection of unlabeled specimens for determinative purposes.

The University has from time to time come into the possession of various private mineral collections of which the LEDERER, ROMINGER, GARRINGER, and COLLIER collections may be mentioned. All the above collections are housed in the Mineralogical Laboratory in the basement of Tappan Hall.

III. THE ZOOLOGICAL COLLECTIONS are large. They include a collection of animals of the Pacific Coast made by Lieutenant Trowbridge, and many valuable specimens collected in the Philippine Islands by Dr. Joseph B. Steere.

The Bird Collection includes about 6,000 skins and 1,600 mounted specimens. The collection of Alcoholic Material includes a series of invertebrate types, as well as many interesting vertebrates and a considerable number of anatomical preparations. It is stored in a darkened room. The Mollusk Collection includes the shells of nearly 6,000 species, representing most of the genera of land, fresh-water, and marine mollusks. They are thoroughly clasified and arranged according to the latest authorities, making the collection of special value to the student. The Coral Collection includes a large number of species, mostly from Formosa and the Philippines.

IV. THE ANTHROPOLOGICAL COLLECTIONS. Among the most notable features of this department of the Museum are:—

a. The Oriental Section, including the entire Chinese Collection, which the Chinese Government sent to the New Orleans Exposition in 1885.

b. The Stearns Collection of musical instruments, comprising over 1,400 typical instruments of all nations—ancient and modern, civilized and savage—illustrating the history of music and the progress of musical art.

c. The collection of Peruvian and New Mexican ceramics, including an exceptionally fine series of ancient Peruvian burial pottery and modern basins secured by the Beal-Steere Exposition, and an extensive series of New Mexican pottery received from the Smithsonian Institution.

d. The modern Indian section, including wearing apparel, implements of war and the chase, and household utensils of the South American, North American, and the Alaskan Indians, and a fine example of the Alaskan totemic column.

e. The Stone Age section, including the local collection of the late David De Pue, a series of Danish implements, and a series of casts of rare implements prepared by the Smithsonian Institution.

Special Collections and Museums

THE BOTANICAL COLLECTION is shelved in the Botanical Laboratory, and contains, in addition to Michigan plants collected by the public surveys, several valuable herbaria and sets of plants that have been presented to the University from time to time. Among these some of the most important are the HOUGHTON HERBARIUM, the SAGER HERBARIUM, the AMES HERBARIUM, the HARRINGTON COLLECTION, the BEAL-STEERE BOTANICAL COLLECTION, the ADAM-JEWETT COLLECTION, and the GARRIGUES COLLECTION.

The collections in PHARMACOGNOSY and INDUSTRIAL CHEMISTRY occupy a floor space of 2,500 square feet in the chemical building.

The Pharmacognosy Collection comprises several thousand mounted and labeled specimens of products from all parts of the world, such as are used for medicinal, alimentary, and industrial purposes. The cultivation and preparation for the market and the commerce of these articles among the peoples of the earth, are illustrated by collections of authentic photographs, many of which have been expressly procured for the study of commerce with distant parts of the world.

The collection in Industrial Chemistry illustrates the natural resources and chief manufactures of Michigan, and of various parts of the world. Crude materials, raw and unfinished products, as well as completed articles of commerce in their several grades are displayed, together with models and plans of production by modern methods.

Museum of Fine Arts and History

The works of art belonging to the University are on exhibition in the galleries provided for them in the library building. A printed catalogue, prepared by Professor Martin L. D'Ooge, contains fuller descriptions than can here be given. The collection was begun in 1855. It contains a gallery of casts in full size and in reduction, of some of the most valuable ancient statues and busts, such as the Hermes of Praxiteles, the Apollo Belvedere, the Laocoon, the Wrestlers and the Sophocles; casts of the sculptural decorations from the arch of Trajan at Benevento, presented by the class of 1896; more than two hundred reductions and models in terra cotta and other materials; the statue of Nydia by Randolph Rogers; casts of modern statues, busts, etc., and reliefs; a number of engravings and photographic views, illustrating especially the architectural and sculptural remains of Ancient Italy and Greece; a small collection of engraved copies of the great masterpieces of modern painting; two series of historical medallions—the HORACE WHITE COLLECTION and the GOVERNOR BAGLEY COLLECTION—the former illustrative of ancient, mediæval, and modern European history, the latter designed to embrace the commemorative medals struck by order of Congress or other authorities, and now containing one hundred such medals; and a large collection of coins, chiefly Greek and Roman, presented to the University by the late Dr. Abraham E Richards.

THE ROGERS GALLERY comprises the entire collection of the original casts of the works of the late Randolph Rogers, more than a hundred in number. It was given by that distinguished sculptor to the State of Michigan for the University museum.

THE LEWIS GALLERY, bequeathed to the University by the late Henry C. Lewis, of Coldwater, comprises about four hundred and fifty paintings and forty pieces of statuary.

THE DE CRISCIO COLLECTION OF LATIN INSCRIPTIONS, about 260 in number, ranging in age from the reign of Augustus to the 5th century, A. D. Most of the inscriptions are on slabs of marble. This collection was acquired in 1899 through the generosity of Mr. Henry P. Glover, of Ypsilanti.

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The late J. Q. Adams Fritchey, A.M., of St. Louis, Mo., a graduate in the Class of 1858, bequeathed to the University a collection of modern coins, medals, and medallions, numbering about one thousand, issued prior to 1876, and possessing historic value and interest to numismatics.

Dr. Henry Smith Jewett (A.B., 1868), of Dayton, Ohio, has recently presented to the University a complete set of the various issues of fractional currency issued by the United States government during the Civil War and Reconstruction periods. Accompanying this collection is a nearly complete set of the "documentary" stamps issued by the government during the Civil War.

A small but valuable collection of Egyptian antiquities has recently been presented to the University by A. M. Todd, of Kalamazoo, Mich.

SOCIETIES

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experiment, reviews of recent literature, etc. These societies are the following:

The Philological Association, the Classical Journal Club, the Romance Journal Club, Cercle Français, the Germanic Journal Club, University Oratorical Association, the Political Science Club, the Philosophical Society, the Mathematical Society, the Physical Colloquium, the Chemical Colloquium, the Zoological Journal Club, and the Botanical Journal Club.

FELLOWSHIPS

Elisha Jones Classical Fellowship

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband, Professor Elisha Jones, a graduate of this University in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President Angell, and Professors D'Ooge, Kelsey and Reed. The period of incumbency is limited

to two academic years, and must be spent at this University unless at any time the examining board shall see fit to allow the second year to be spent at some other place favorable to classical study.

No income has been available for the current year.

Newberry Classical Fellowship

Mrs. Helen H. Newberry, of Detroit, who gave the sum of three hundred dollars in 1904 for the maintenance of a Fellowship in the classics, continued the Fellowship for 1907-1908. The holder of the Fellowship for the year was Ludwig Thorsten Larsen, A.M.

Buhl Classical Fellowship

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1907-1908. The joint holders of the Fellowship for the year were Ray Eli Cleveland, A.B., and Alvin Eleazer Evans, A.M.

Peter White Classical Fellowship

Provision for a Classical Fellowship, with an income of three hundred dollars, was continued for the year 1907-1908 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was Albert Robinson Crittenden, A.M.

Peter White Fellowship in American History

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1907-1908 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was Clyde L. King, A.B.

The George S. Morris Fellowship in Philosophy

The sum of four hundred and fifty dollars was again received from Mrs. George S. Morris for the support of a Fellowship or Scholarships to be known as the George S. Morris Fellowship or Scholarships in Philosophy, in honor of George S. Morris, Professor of Modern Languages and Literature from 1870 to 1879, and of Philosophy from 1881 to 1889, and for the purchase of books for the Morris Philosophical Library. Fifty dollars were devoted to the latter purpose, and one Fellowship and one Scholarship were established, which were awarded for the year 1907-1908, respectively, to Frank Van Vliet, A.B., and Elmer Cleveland Adams.

Mrs. Morris will make a similar gift for 1908-1909, and the amount will be divided, or not, at the discretion of the instructors in Philosophy. Applications should be sent in before May 1, and should be accompanied by the fullest credentials.

Fellowship in Chemistry

The sum of five hundred dollars was given by Messrs. Parke, Davis and Company, of Detroit, for the continuation in the year 1907-1908 of the Fellowship in Chemistry established by them in 1895. The holder of the Fellowship for the year was George Byron Roth, A.B.

Assistant Professors SANDERS and MEADER:—

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Assistant Professor SANDERS:—

[The Sources of the Roman Historians.

Lectures with direction of work on special themes.—*Two hours a week, first semester.*

This course will be omitted in 1908-1909.]

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimilies.—*Two hours a week, first semester.*

Assistant Professors SANDERS and MEADER:—

[Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Omitted in 1908-1909.]

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Assistant Professor MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

[The Pseudo-Cæsarian *Bellum Africanum* and *Bellum Hispaniense*.

Interpretation of the texts and critical study of their syntactical and stylistic peculiarities, accompanied by a continual comparison with the usages of Cæsar.—*Two hours a week, first semester.*

This course will be omitted in 1908-1909.]

Rapid Reading of Easy Latin.

The aim of this course is to develop the ability to read Latin without the use of a dictionary.—*Two hours a week, first semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

Summer Session, 1908

Opportunities for graduate work in Latin will be offered during the Summer Session. This work is accepted as a partial fulfillment of the residence requirement for the higher degrees. For the courses to be given in the summer of 1908, consult the announcement of the Summer School.

ROMAN LAW AND JURISPRUDENCE

Professor DRAKE:—

History of Roman Law.

Lectures. A sketch of the development of Roman Private Law, and the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages; and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparison.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law is given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, first semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

The Science of Jurisprudence.

A study of the fundamental principles of positive law.—*Two hours a week, second semester.*

SANSKRIT

The graduate work in Sanskrit is arranged with special reference to the needs of two classes of students: (1) Those who desire to obtain a general acquaintance with the structure of the language on account of the light which the comparative study of Sanskrit throws upon the sounds, inflection and syntax of the ancient and modern languages of Europe. By such students it may be advantageously taken either as a minor subject or as a part of their major study. Such students will use texts printed in Roman characters and thus be required to waste no time in the mastery of a difficult oriental alphabet. (2) Those who wish to obtain a fuller mastery of the language and literature as a preparation for (a) the teaching either of Sanskrit or of General Linguistic and Comparative Philology, for (b) the study of Religion and Comparative Literature, for (c) missionary or other activities in India, of which Sanskrit is the sacred language, spoken by all brahmins.

No announcement of courses of instruction is here made, since the work will in most cases require adjustment to the needs of the individual students.

The work in Sanskrit is conducted by Assistant Professor MEADER.

GENERAL LINGUISTICS AND COMPARATIVE PHILOLOGY

The courses announced below are designed for students of both ancient and modern languages. They aim to familiarize the students with the general principles and methods of the Science of Language, to present the most important facts in the life and growth of language, and to offer an opportunity and direction in original investigations.

Assistant Professor MEADER:—

GENERAL COURSES

Designed for those who study the subject as a collateral to work in special languages.

Principles of Linguistic Science.

The aim of the course will be to familiarize the student with the general principles and the more important problems of linguistic science. Among the topics discussed are: the relation of the Science of Language to the other humanistic sciences and to the natural sciences; Psychology and the Science of Language; the processes of word-formation and development and loss of inflection; development of syntactical forms; causes and manner of changes in meaning; representative types of language structure, various bases of classification; theories concerning the origin of language.—*Two hours a week, first semester.*

Comparative Philology.

The aim of the course will be the study of the origin and development of the sounds, inflections and syntactical forms of the Indo-European languages. The course will deal with the methods and principles of comparative philology, the chief characteristics of the Indo-European languages, their relationships and classification, the sounds and inflections of the Greek, Latin (French) and Germanic languages, accent and vowel gradation (Ablaut), analogy, comparative syntax, bibliography of comparative philology. Lectures and recitations.—*Two hours a week, second semester.*

SPECIAL COURSES

No courses can here be described in detail as they must vary with the needs of the students. In general they will be directed toward the intensive study of special problems in the fields of phonology, morphology and semantics (Science of Meanings).

CLASSICAL ART AND ARCHÆOLOGY

The following courses do not require a knowledge of Greek or of Latin. The large collection of lantern slides and photographs owned by the University makes it possible to illustrate all these courses fully. The collection of casts of ancient sculpture in the Art Gallery is also utilized in the courses in ancient art. A more complete statement of the material at hand for the study of Roman Archæology is given under the department of Latin.

Professor D'OUGE:—

[Ancient Greek Life. Athens and its Monuments.

Lectures illustrated by means of stereopticon slides.—*Two hours a week, second semester.*

Omitted in 1908-1909; to be given in 1909-1910.]

History of Greek Art from the Beginning to the Roman Period.

Lectures and assigned readings on Greek Architecture, Sculpture, Vase-painting, and the minor arts. The course is illustrated with the stereopticon, and occasional lectures are given in the Art Gallery.—*Three hours a week, first semester.*

Professor KELSEY:—

[The Topography and Monuments of the City of Rome.

Lectures, illustrated.—*Three hours a week, second semester.*
Omitted in 1908-1909; to be given in 1909-1910.]

[Roman Art as Studied in the Monuments:

Introduction to Roman Archæology; Elements of Roman Architecture; sculpture, painting and the minor arts in the Roman period. Lectures, illustrated with the stereopticon.—*Three hours a week, second semester.*

Omitted in 1908-1909.]

Professor BONNER:—

Greek Religion.

Illustrated lectures and assigned topics for investigation.—*Two hours a week, second semester.*

Greek and Roman Mythology.

Lectures. Illustrated with the stereopticon.—*One hour a week, second semester.*

SEMITICS AND HELLENISTIC GREEK

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of the classical and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

NOTE.—The selections in the linguistic courses offered below may be changed to meet special needs of applicants.

Professor CRAIG and Dr. FRENCH:—

HEBREW*

Genesis.

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzsch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

Historical Literature: Judges and I and II Samuel.

Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

Prophetic Literature.

Amos, Hosea, and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

ASSYRIAN

Introduction to Easy Historical Inscriptions.

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's *Assyrische Lesestücke, vierte Auflage*.—*Three hours a week, first semester.*

Historical Inscriptions.

Selecons from the Cuneiform Inscriptions of Western Asia (R. I-V.)—*Three hours a week, second semester. [1909-1910.]*

Babylonian Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

Religious Literature.

King's "The Prayers of the Lifting-up of the hand." Craig's "Religious Texts."—*Two hours a week, second semester. [1909-1910.]*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

HISTORY AND ARCHÆOLOGY

Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

Lectures on the History of Israel and Judah.

From earliest times to the Reformation of Ezra.

Lectures. Introduction to the Study of the Old Testament.

Lectures. Study of the Prophetic Books of the Old Testament.

Lectures. The Religion of the Semites.

Lectures. The Wisdom Literature of the Jews and comparison with similar productions by other peoples.

ARABIC

Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünow's Chrestomathy.—*Two hours a week, second semester.*

Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

ARAMAIC, SYRIAC, ETHIOPIC

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

HELLENISTIC GREEK

New Testament.

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester. week, first semester.*

Septuagint.

Selections from the historical books and the prophets with comparison of the Hebrew and Vulgate Texts. Swete's Edition.

ROMANCE LANGUAGES AND LITERATURE

FRENCH

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1907-1908.

Professor CANFIELD:—

Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Three hours a week, throughout the year.*

The History of the Novel in France.

This course will trace the growth of the novel as a form of literature and its various transformations. A number of representative masterpieces of different periods will be read, and both their technical qualities and their relation to the social and intellectual environments of the time will be studied. Particular attention will be given to the preparation and development of the movement of realism in the nineteenth century. Open to graduates and undergraduates.—*Three hours a week, throughout the year.*

Seminary in French Literature.

The early works of Victor Hugo. Various questions with regard to the sources, structure, style, etc., of these works will be examined.—*Two hours a week, throughout the year.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Hugo and Balzac.

The art and literary methods as seen in the novels of those writers. Lectures, readings, reports, and discussions. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor EFFINGER:—

The Dramatic Literature of the Eighteenth and Nineteenth Centuries.

The Drama of the Revolution; the Melodramatic Period; the Romantic Movement; the Modern Drama. Lectures, reading, and reports.—*Two hours a week, throughout the year.*

Proseminary in French Literature.

The Romantic Drama.—*Two hours a week, throughout the year.*

Assistant Professor THIEME:—

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

Dr. HAMILTON:—

Introduction to the Literature of the Old French period, reading of Old French texts.—*Two hours a week, first semester.*

PROVENÇAL

Dr. HAMILTON:—

Outline of the Grammar, with readings in Appel's Provençalische Chrestomathie. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN

The minimum requirement for admission to the courses announced below consists of courses 1 and 2 described in the University Calendar for 1907-1908, or an equivalent.

Professor LEVI:—

Dante: La Vita Nuova and La Divina Commedia.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, and 3 and 3a, described in the University Calendar for 1907-1908, or an equivalent.

Assistant Professor WAGNER:—

The Don Quixote.

In this course the masterpiece of Cervantes will be critically read and the manifold aspects of its significance studied.—*Two hours a week, throughout the year.*

[Lope de Vega and the Classical Drama.

Representative masterpieces of the drama of the seventeenth century will be read and interpreted.—*Two hours a week, throughout the year.*

Omitted in 1908-1909.]

Outline of the History of Spanish Literature.

Lectures intended to accompany the foregoing courses and to offer such a view of the more important movements in Spanish literature that the works studied may be seen in their proper historical perspective.—*One hour a week, throughout the year.*

Summer Session, 1908

Graduate students competent to enroll for a higher degree who wish to work in French will be given direction along the lines best suited to their needs. Only the general division of the work is indicated below. Candidates for graduate work are urged to confer personally or by letter with the instructor in charge of the subject they wish to take up before the beginning of the session.

Professor EFFINGER:—

Modern French Literature.

Work will be directed, according to the needs of students, in the study of special periods, of the history of special literary forms, as the drama or the novel, or of particular authors, or in the investigation of a special question.

Professor CANFIELD:—

French Philology and Old French.

Students will be given direction either in an introductory study of the elements of historical grammar or of the literature of the Old French period, or in a more thorough study of selected texts or of special subjects connected with mediæval literature.

GERMANIC LANGUAGES AND LITERATURE**GERMAN**

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 9a, 10 and 10a, and options in 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8, as described in the University Calendar for 1907-1908, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Robertson, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual tation of the *Nibelungenlied*, *Gudrun* and minor epics. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout year.*

Proseminary in Schiller.

A comprehensive study of Schiller's life and works with special emphasis upon his philosophical speculations and their influence upon his poetical activity. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Teachers' Courses.

(a) Selected dramas of Schiller, Lessing and Goethe. Lectures, discussions and reports.—*Two hours a week, throughout the year.*

(b) Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

JOURNAL CLUB:—

Current Literature on Germanic Philology.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year at which reports are made on the important contributions to Germanic philology and literature.

Professor DIEKHOFF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Reading and interpretation of the *Nibelungenlied*, *Gudrun* and minor epics. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout year.*

The Middle High German Court Epic.

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the court-epic. Reading and interpretation of *Parzival*. Reports on assigned topics. Primarily for graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

Proseminary in Lessing.

A comprehensive study of the life and works of Lessing. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behagel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1908-1909; to be given in 1909-1910.]

Assistant Professor HILDNER:—

Proseminary in the Storm and Stress Movement.

Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Schiller, Heinse, etc. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Friedrich Hebbel.

A critical study of his leading dramas. Lectures, discussions and reports. Advanced course for undergraduates and graduates.—*Two hours a week, first semester.*

Assistant Professor BOUCKE:—**Heinrich Heine.**

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, first semester.*

Proseminary in Goethe.

A critical study of the leading works of Goethe. Reports, lectures, discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the courses in German literature, and gives a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of German Literature from 1848-1900.

A general survey of the main literary currents of this period, with special emphasis upon the leading dramatists and novelists and upon the recent naturalistic movement in Germany. Lectures, discussions and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor FLORER:—**Life and Works of Luther.**

Lectures on Luther's influence on the development of the German written language. Discussions of the relation of Luther's teachings to the modern religious movements in Germany. Advanced course open to graduates and undergraduates.—*Two hours a week, first semester.*

Studies in the Development of the German Novel.

Lectures on the leading tendencies of the modern German novel with special emphasis upon the recent works of Frenssen and Rosegger. Advanced course open to undergraduates and graduates.—*Two hours a week, second semester.*

GOTHIC

Dr. EGGERT:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of German Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN

Dr. HOLLANDER:—

Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

PHONETICS

Dr. EGGERT:—

The Elements of Phonetics.

A study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first or second semester.*

Summer Session, 1908

The advanced and graduate courses in German, announced below, presupposes a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 9a, 10 and 10a, and options in 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8, as described in the University Calendar for 1907-1908, or work equivalent to the courses mentioned.

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Robertson, *History of German Literature*. Advanced course open to undergraduates and graduates.

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.

Of the above three courses, the two elected by the larger number of students will be given during the Summer Session.

Professor DIEKHOFF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.

Of the above three courses, the two selected by the larger number of students will be given during the Summer Session.

ENGLISH

The following courses (open also to undergraduates who are prepared to take them) will ordinarily be found adapted to the needs of graduate students. In cases of students who have specialized in English for their first degree, additional advanced courses for graduate study are provided after conference with the candidate. Some of the subjects assigned in recent years are the following: The English Satirists of the Sixteenth, Seventeenth, and Eighteenth Centuries; The Romantic Revival in the Eighteenth Century; The Rise and Development of the English Chronicle Play; Elizabethan Comedy; Elizabethan Tragedy.

Assistant Professor TILLEY:—

Anglo-Saxon Poetry.

It is the object of this course to make the student familiar with the most important poetical literature of the Old-English period.—*Two hours a week, second semester.*

The History of the English Language.

Lectures on the most important factors in the history of the language, together with the investigation of the cause and process of certain changes in usage.—*Two hours a week, first semester.*

Modern English Grammar.

This course is intended specially for candidates preparing to teach English grammar.—*Two hours a week, second semester.*

The English Drama Before Shakespeare.

Two hours a week, second semester.

Professor TATLOCK:—

Anglo-Saxon.

This course aims to give a sense of the development and continuity of the English language, some acquaintance with Anglo-Saxon literature, and a reading knowledge of West-Saxon prose.—*Two hours a week, first semester.*

[English Literature of the Thirteenth and Fourteenth Centuries.

This course is open, without permission, to those only who take, or have taken, a course in Chaucer. It will deal mainly with pre-Chaucerian Middle English literature, and will consist in lectures and outside reading, with the purpose of illustrating Chaucer and the Middle Ages. Mediæval literature will be classified according to its various *genres* and origins; an account will be

given of twelfth century Latin literature, of the chronicles, of the origins of the Arthurian and other romantic material, of the fabliaux, the legends, and the like. This course may advantageously be taken by students of any modern literature or of mediæval history.—*Two hours a week, first semester.*

Omitted in 1908-1909; to be given in 1909-1910.]

English Literature from Chaucer to the Renaissance.

This course consists in lectures and outside reading on Wyclif, Chaucer, Gower, Langland, Malory, Skelton, the Scottish poets of the fifteenth and sixteenth centuries, and other writers, and on the native origins of the English drama.—*Two hours a week, first semester.*

[Chaucer. Advanced Course.

Two hours a week, second semester.

Omitted in 1908-1909; to be given in 1909-1910.]

Middle English.

The course will consist of the reading in class of the selections from early prose and verse in Professor Emerson's *Middle English Reader*; the requisite attention will be paid to the language itself. The course may advantageously be preceded or accompanied by a course in Chaucer.—*Two hours a week, second semester.*

Professors DEMMON and STRAUSS:—

English Literature Seminary.

Each student is expected first, to read the entire list of works with which the course deals, together with such critical literature on each subject as there may be time for; second, to present an essay upon an assigned masterpiece; third, to participate each week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of varying types. The list of masterpieces is as follows: Spenser's *Faery Queen*; Shakespeare's *Sonnets*; Milton's *Paradise Lost*, and *Paradise Regained*; Dryden's *Absalom and Achitophel*; Pope's *Essay on Man*; Wordsworth's *Prelude*, and *Excursion*; Tennyson's *Maud*, and *Idylls of the King*; Browning's *The Ring and the Book*; Swinburne's *Atalanta in Calydon*.—*Three hours a week, first semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: *A Midsummer Night's Dream*; *The Merchant of Venice*; *As You Like It*; *Twelfth Night*; *The Tempest*; *Richard III*; the two parts of *Henry IV*; *Henry V*; *Romeo and Juliet*; *Hamlet*; *Othello*; *King Lear*; *Macbeth*; *Coriolanus*.—*Three hours a week, second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctively American element by a comparative study with British authors.—*Three hours a week, second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*One hour a week, throughout the year.*

Studies in the Text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like Hamlet, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

The Development of the English Novel.

A study of the rise of the novel in England as an art form, with an attempt to discover the principle of its development. Lectures, discussions, and readings in the works of Lyly, Greene, Lodge, Nashe, Sidney, Bunyan, Defoe, Swift, Addison and Steele, Richardson, Fielding, Smollett, Sterne, and others.—*Two hours a week, first semester.*

Prose Fiction of the Nineteenth Century.

Lectures, discussions, and readings in the works of Scott, Austen, Bulwer-Lytton, Disraeli, Dickens, the Brontë sisters, George Eliot, Reade, Trollope, Kingsley, Meredith, Blackmore, Hardy, Stevenson, and others.—*Two hours a week, second semester.*

A Study of Poetic Forms (Epic, Lyric, Drama).

Readings in the works of Tennyson, Arnold, Morris, Rossetti, and Swinburne. Some attention will be given to English metres.—*Three hours a week, second semester.*

Summer Session, 1908

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in English along the lines best suited to their needs. The courses offered below are considered well adapted to the greater number.

FOR GRADUATES AND UNDERGRADUATES

Assistant Professor TILLEY:—

Historical English Grammar.

By the study of the principles of historical grammar, of comparative grammar, and of the psychology of speech, modern English grammar is shown to be a living outgrowth of the past stages of the language. This course is designed especially for teachers of English grammar.

Professor DEMMON:—

Chaucer.

The aim of this course is to give the student three things, some acquaintance with mediæval life as it is illustrated by the *Canterbury Tales*, an understanding of the English language of the fourteenth century, and a familiarity with Chaucer and his poetry. A system of pronunciation will be taught approximating to that of the fourteenth century. The Prologue and several of the *Tales* will be read in class, and some of Chaucer's other works will be assigned for outside reading.

PRIMARILY FOR GRADUATES

Professor DEMMON:—

Dramatic History and Technique.

With special reference to Shakespeare, his predecessors and his contemporaries. This course is designed primarily for graduate students working towards a higher degree. Pollard's "*English Miracle Plays*," Woodbridge's "*Drama, its Law and its Technique*," TenBrink's "*Five Lectures on Shakespeare*," Lewis Campbell's "*Tragic Drama*," and Bradley's "*Shakespearean Tragedy*," will be found useful books of reference for this course. [For candidates who have already been over this course, the readings and discussions will be varied to meet their needs.]

RHETORIC

The advanced and graduate courses described below presuppose an acquaintance with the fundamental principles of rhetoric and a reasonable proficiency in the technique of prose. The study of composition, except where it is pursued with reference to the theory of teaching, is regarded as an undergraduate study.

Professor SCOTT:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

Newspaper Writing: Theory and Practice.

Intended for students who are preparing to do newspaper work. The class will prepare and publish, in the course of the semester, several issues of a daily paper.—*Two hours a week, first semester.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

Teachers' Course. Methods of Teaching English Composition and Rhetoric.

The course includes an outline of the principles of rhetoric and a discussion of the chief problems of composition teaching.—*Two hours a week, second semester.*

Seminary in Rhetoric and Criticism.

The subjects of discussion vary from year to year. Among the problems to be investigated are the following: The origins of prose; the nature and origin of the leading types of discourse; the psychology of figures of speech; the rhythm of prose; the sociological basis of the principles of usage. In 1908-1909 a study is made of the origin, development and laws of the process of communication.—*Two hours a week, throughout the year.*

Assistant Professor THOMAS:—

Studies in the Theory of Style.

Analysis will be made of some of the most noted essays on style by authors representing the various points of view from which the subject has been considered. Among others, De Quincey, Spencer, Pater, and Stevenson will be taken up. This course will be conducted as a seminary.—*Two hours a week, second semester.*

Short Story Writing.

Analytic studies in the technique of the short story will be accompanied by constructive work in story writing.—*Two hours a week, second semester.*

Mr. MORRILL:—

Reviews.

The aim of this course is to furnish instruction, and give practice, in the writing of book-reviews for newspapers and magazines. A few lectures on standards of criticism and methods of reviewing will be given, and specimen reviews will be analyzed in detail.—*Two hours a week, second semester.*

ORATORY

Professor TRUEBLOOD:—

Study of Great Orators.

Lectures on methods of public address and sources of power. Study of representative orations. Structure of the oration. Qualities of a good oration. Brief making. The preparation and delivery of speeches. Those who desire at some time to enter the debating contests should take this course.—*Two hours a week, first semester.*

Debating.

Study and application of the principles of argumentation. Preparation of briefs. Leading questions of the day studied and debated in class. The aim is to develop readiness in extempore speaking, to give freedom and ease on the platform, and to cultivate the logical processes of analysis and discrimination. All who expect to enter the debating contests or who expect to teach argumentation should take this course.—*Two hours a week, throughout the year.*

Shakespearean Reading.

Critical study of four plays, two tragedies and two comedies. Analysis of character, plot and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes presented from the platform. Public recitals twice each semester. Plays to be selected.—*Two hours a week, throughout the year.*

Mr. HOLLISTER:—

Forensic Masterpieces.

This course is designed to cultivate an appreciation of the oratory of a few leading English-speaking orators, and to develop expressive reading and speaking. A critical study of the principal speeches of five or six great orators, and delivery from the platform of extracts from those speeches. Selections made from the following: Hamilton, Webster, Phillips, Lincoln, Beecher, Chatham, Burke, Erskine, Bright, and Gladstone.

MUSIC

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional; while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the largest works bearing on this and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group should have mastered it, although it is not demanded as a condition of entrance upon the work.

Professor STANLEY:—

FIRST GROUP

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

SECOND GROUP

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY

Professor HUDSON:—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

The History of England.

From the Revolution of 1688 to the present day.—*Three hours a week, throughout the year.*

Europe in Asia and Africa.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, and the partition of Africa.

Professor DOW:—

Seminary in Medieval History.

In this work an introductory survey is made of the chief problems of historical method, and attention is given to historical bibliography, diplomatics, and other aids to the study of history.

The main purpose in view, however, is to provide practice in historical investigation and writing. The members of the Seminary co-operate with the instructor in the study of some subject from the sources and take part in critical and constructive exercises.

Age of the Renaissance and the Reformation.

A survey of the history of Europe at the end of the middle ages and through the sixteenth century, with especial attention to the many-sided environment of the Reformation and to the progress and some of the consequences of that movement.—*Two, three, or four hours, throughout the year.* To be given in 1908-1909 and in alternate years thereafter.

[The Later Middle Ages.

A survey of the history of Europe in the fourteenth and fifteenth centuries, with especial attention to the development of modern states and some accompanying changes in civilization.—*Two, three, or four hours a week, second semester.* To be given in 1909-1910 and in alternate years thereafter.]

[Medieval Civilization.

A survey of the history of Europe in the feudal period, with especial attention to the organization of society and the life of people. *Two, three, or four hours a week, first semester.* To be given in 1909-1910 and in alternate years thereafter.]

Professor CROSS:—

Studies in English History since the Reformation.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which is primarily concerned with the separation from Rome under Henry VIII, and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the Church, are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689.

Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents.

The course for 1907-1908 deals with the Restoration.—*Two hours a week, throughout the year.*

Summer Session, 1908

Professor CROSS:—

History of England from the Norman Conquest to the end of the Reign of Edward I.

Professor SIOUSSAT:—

History of Europe during the Renaissance and the Reformation.

AMERICAN HISTORY

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes the following group of courses which covers the several fields of American history and culminates in a seminary devoted to original research. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American History, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher.

Professor VAN TYNE:—

Constitutional and Political History of the United States, 1775-1861.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lecture, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat

somewhat carefully the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort is also made to trace the political and social development of the country.—*Three times a week, throughout the year.*

Seminary in American History.

This course is primarily for graduate students who have already done considerable historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. Graduate students will receive individual attention and assistance in the prosecution of their investigations.—*Two hours a week, throughout the year.*

Professor PAXSON:—

American Colonial History.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.—*Three times a week, second semester.*

United States History from the Beginning of the Civil War (1860) to the Present Time.

In addition to the political and constitutional questions of the war and reconstruction periods, the lectures will deal with the social and economic conditions existing in the North and the South, both during those periods and after. The race question, the "Solid South," the industrial expansion, and the evolution of the United States into a world power will be treated. The lectures will be amplified by assigned reading and informal discussions.—*Three times a week, throughout the year.*

[American Economic and Social History.

This course is intended to parallel the course on Constitutional and Political History. It covers the same period, extending, however, to 1895. Much stress is laid upon the history of transportation, finance, and social life, together with the economic institutions made necessary in the growth of the United States.

Omitted 1908-1909.]

Studies in American History.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Important social, economic, diplomatic and political problems not fully treated in the regular lecture courses are chiefly selected for treatment. Oral reports are prepared under the direction of the instructor. Special facilities are given for the use of the library.
—*Two hours a week, throughout the year.*

Summer Session, 1908

Professor PAXSON:—

Seminary in American History.

This course will be given, as announced above. It will be devoted to a study of certain aspects of the "Westward Movement."

United States History during the Civil War and Reconstruction.

This course is the first half of the similar course described above. It covers the years 1860-1877.

Professor SIOUSSAT:—

Constitutional and Political History of the United States. (1800-1860.)

This course is the second half of the similar course described above.

GOVERNMENT

Professor HUDSON:—

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor FAIRLIE:—

National Administration of the United States.

This course is a study of the United States national government in action. It begins with a brief analysis of the federal system, the organization and procedure of Congress and the special executive powers of the Senate. This is followed by a

study of the legislative and administrative powers of the President, the cabinet and each of the executive departments and their various administrative services, such as the diplomatic and consular service, revenue administration, the postoffice, etc. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service. A brief survey will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers and institutions. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the workings of the governmental machinery, will be briefly discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor, and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, first semester.*

Comparative Administration.

Two courses dealing with national and local administration will be offered in alternate years. In the former a study will be made of the various branches of national administration in the principal European countries in comparison with the corresponding services in the United States. In the second course a similar comparison will be made of American and European local government. Special attention will be given to local administration in the United States and England, showing in the latter country the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the less centralized but more bureaucratic administration in Prussia, and the system of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Two hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties in cities, recent legislation concerning primaries, municipal reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Political Parties.

A study of the development of parties and party organization in Great Britain and the United States, of the present system of party machinery in these countries and its influence on the government, and of recent and proposed political reforms, including legislation on party primaries. Lectures and reading in Ostrogorski's *Democracy and the Organization of Political Parties*, Woodburn's *Political Parties*, Macy's *Party Organisation* and other books.—*Two hours a week, one semester.*

Seminary in Administration.

These are courses for original research on special topics, in national, state or local administration. Special arrangements made with qualified students.—*Two hours a week, each semester.*

See also Courses in ROMAN LAW AND JURISPRUDENCE, page 34.

Additional advanced courses in Public Law are offered in the Law Department, viz.: Constitutional Law, Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

INTERNATIONAL LAW

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

POLITICAL ECONOMY, SOCIOLOGY, INDUSTRY AND COMMERCE

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy." For descriptions see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as Graduate Courses are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

POLITICAL ECONOMY

Professor TAYLOR:—

Principles of Finance.

In this connection the word finance is used in the technical rather than the popular sense. That is, it does not include money, banking, stock speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial considerations, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the media of exchange, including money and its various credit substitutes. This is followed by a study of the natural laws governing monetary phenomena, such as those which fix the monetary standard, those regulating the movement and distribution of money, and so on. Next comes a sketch of monetary history,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking instruments and operation. This is followed by a study of banking theory, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the history of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the nature of capital, the origin of interest, the law of value, and so on. The work of the class hour includes the discussion of readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of economic theory, and so on.—*Two hours a week, second semester.*

Assistant Professor SMALLEY:—

Corporations.

This course undertakes a study of corporations as an element in industrial society. It deals, first, with the nature and history of corporations, and their significance in modern life. It then offers an account of the promotion, capitalization, management, dissolution, and reorganization of corporations,—a discussion designed especially to disclose the evils to which the growth of corporations has given rise. The course concludes with a consideration of various remedies for these evils, including public control of corporations, special attention being given to the proposal of federal incorporation.—*Three hours a week, first semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY

Professor HUDSON:—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

The History of England.

From the Revolution of 1688 to the present day.—*Three hours a week, throughout the year.*

Europe in Asia and Africa.

In a course given the first semester, *three hours a week*, a study is made of the relations of the powers as they are affected by Asiatic and African questions. Among the subjects discussed are the advance of Russia on the Pacific and in Central Asia, the attitude of the powers toward China, and the partition of Africa.

Professor Dow:—

Seminary in Medieval History.

In this work an introductory survey is made of the chief problems of historical method, and attention is given to historical bibliography, diplomatics, and other aids to the study of history.

The main purpose in view, however, is to provide practice in historical investigation and writing. The members of the Seminary co-operate with the instructor in the study of some subject from the sources and take part in critical and constructive exercises.

Age of the Renaissance and the Reformation.

A survey of the history of Europe at the end of the middle ages and through the sixteenth century, with especial attention to the many-sided environment of the Reformation and to the progress and some of the consequences of that movement.—*Two, three, or four hours, throughout the year.* To be given in 1908-1909 and in alternate years thereafter.

[The Later Middle Ages.

A survey of the history of Europe in the fourteenth and fifteenth centuries, with especial attention to the development of modern states and some accompanying changes in civilization.—*Two, three, or four hours a week, second semester.* To be given in 1909-1910 and in alternate years thereafter.]

[Medieval Civilization.

A survey of the history of Europe in the feudal period, with especial attention to the organization of society and the life of people. *Two, three, or four hours a week, first semester.* To be given in 1909-1910 and in alternate years thereafter.]

Professor CROSS:—

Studies in English History since the Reformation.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which is primarily concerned with the separation from Rome under Henry VIII, and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty, the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced in detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the Church, are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II. and James II., the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689.

Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents.

The course for 1907-1908 deals with the Restoration.—*Two hours a week, throughout the year.*

Summer Session, 1908

Professor CROSS:—

History of England from the Norman Conquest to the end of the Reign of Edward I.

Professor SIOUSSAT:—

History of Europe during the Renaissance and the Reformation.

AMERICAN HISTORY

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes the following group of courses which covers the several fields of American history and culminates in a seminary devoted to original research. Reference may also be made to a course in the principles of Constitutional Law and Political Institutions of the United States, which is given in the Department of American History, and is fitted into other work that is more strictly historical in character. (See Calendar.) A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher.

Professor VAN TYNE:—

Constitutional and Political History of the United States, 1775-1861.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lecture, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat

somewhat carefully the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort is also made to trace the political and social development of the country.—*Three times a week, throughout the year.*

Seminary in American History.

This course is primarily for graduate students who have already done considerable historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. Graduate students will receive individual attention and assistance in the prosecution of their investigations.—*Two hours a week, throughout the year.*

Professor PAXSON:—

American Colonial History.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.—*Three times a week, second semester.*

United States History from the Beginning of the Civil War (1860) to the Present Time.

In addition to the political and constitutional questions of the war and reconstruction periods, the lectures will deal with the social and economic conditions existing in the North and the South, both during those periods and after. The race question, the "Solid South," the industrial expansion, and the evolution of the United States into a world power will be treated. The lectures will be amplified by assigned reading and informal discussions.—*Three times a week, throughout the year.*

[American Economic and Social History.

This course is intended to parallel the course on Constitutional and Political History. It covers the same period, extending, however, to 1895. Much stress is laid upon the history of transportation, finance, and social life, together with the economic institutions made necessary in the growth of the United States.

Omitted 1908-1909.]

Studies in American History.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Important social, economic, diplomatic and political problems not fully treated in the regular lecture courses are chiefly selected for treatment. Oral reports are prepared under the direction of the instructor. Special facilities are given for the use of the library. —*Two hours a week, throughout the year.*

Summer Session, 1908

Professor PAXSON:—

Seminary in American History.

This course will be given, as announced above. It will be devoted to a study of certain aspects of the "Westward Movement."

United States History during the Civil War and Reconstruction.

This course is the first half of the similar course described above. It covers the years 1860-1877.

Professor SIOUSSAT:—

Constitutional and Political History of the United States. (1800-1860.)

This course is the second half of the similar course described above.

GOVERNMENT

Professor HUDSON:—

Political Institutions.

In a course given the second semester, *three hours a week*, a comparative study is made of the political institutions of France, Italy, Germany, Switzerland, and Austria-Hungary. Political parties are studied in connection with institutions, and an effort is made to trace the connection between political and party organization.

Professor FAIRLIE:—

National Administration of the United States.

This course is a study of the United States national government in action. It begins with a brief analysis of the federal system, the organization and procedure of Congress and the special executive powers of the Senate. This is followed by a

study of the legislative and administrative powers of the President, the cabinet and each of the executive departments and their various administrative services, such as the diplomatic and consular service, revenue administration, the postoffice, etc. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service. A brief survey will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different States of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers and institutions. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the workings of the governmental machinery, will be briefly discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor, and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Two hours a week, first semester.*

Comparative Administration.

Two courses dealing with national and local administration will be offered in alternate years. In the former a study will be made of the various branches of national administration in the principal European countries in comparison with the corresponding services in the United States. In the second course a similar comparison will be made of American and European local government. Special attention will be given to local administration in the United States and England, showing in the latter country the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the less centralized but more bureaucratic administration in Prussia, and the system of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Two hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities include the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties in cities, recent legislation concerning primaries, municipal reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Political Parties.

A study of the development of parties and party organization in Great Britain and the United States, of the present system of party machinery in these countries and its influence on the government, and of recent and proposed political reforms, including legislation on party primaries. Lectures and reading in Ostrogorski's *Democracy and the Organization of Political Parties*, Woodburn's *Political Parties*, Macy's *Party Organisation* and other books.—*Two hours a week, one semester.*

Seminary in Administration.

These are courses for original research on special topics, in national, state or local administration. Special arrangements made with qualified students.—*Two hours a week, each semester.*

See also Courses in ROMAN LAW AND JURISPRUDENCE, page 34.

Additional advanced courses in Public Law are offered in the Law Department, viz.: Constitutional Law, Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

INTERNATIONAL LAW

The courses in international law presuppose a general acquaintance with modern European history.

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

POLITICAL ECONOMY, SOCIOLOGY, INDUSTRY AND COMMERCE

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy." For descriptions see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as Graduate Courses are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

POLITICAL ECONOMY

Professor TAYLOR:—

Principles of Finance.

In this connection the word finance is used in the technical rather than the popular sense. That is, it does not include money, banking, stock speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial considerations, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the media of exchange, including money and its various credit substitutes. This is followed by a study of the natural laws governing monetary phenomena, such as those which fix the monetary standard, those regulating the movement and distribution of money, and so on. Next comes a sketch of monetary history,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking instruments and operation. This is followed by a study of banking theory, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the history of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under next course.—*Two hours a week, first semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the nature of capital, the origin of interest, the law of value, and so on. The work of the class hour includes the discussion of readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the preceding course are developed into a series of courses covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes made a mere continuance of the preceding; another year it is devoted to a general review of economic theory, and so on.—*Two hours a week, second semester.*

Assistant Professor SMALLEY:—

Corporations.

This course undertakes a study of corporations as an element in industrial society. It deals, first, with the nature and history of corporations, and their significance in modern life. It then offers an account of the promotion, capitalization, management, dissolution, and reorganization of corporations,—a discussion designed especially to disclose the evils to which the growth of corporations has given rise. The course concludes with a consideration of various remedies for these evils, including public control of corporations, special attention being given to the proposal of federal incorporation.—*Three hours a week, first semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country and in the more important European countries, discusses the administrative and legislative organization

of railway systems, studies the history of railway problems in the United States, and pays special attention to the experiment of controlling railways through commissions.—*Three hours a week, second semester.*

Advanced Course in Transportation.

It is the purpose of this course to continue the work of the general course in Transportation by pursuing the investigation of special questions. It is also designed to familiarize students more fully with the literature of the subject, as well as with methods of investigation.—*Two hours a week, first semester.*

Government Control of Industry.

The aim of this course is to consider industrial regulation from the legal point of view. A study is made of the power of government, under our constitutional system, to control industrial action. This involves, in the main, a discussion of the legal doctrines of the police power and of public policy, as far as they are of economic importance, special attention being paid to their bearing upon the solution of the problems of labor and capital, trusts, railroads, and so forth.—*Two hours a week, second semester.*

SOCIOLOGY

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's *Human Nature and the Social Order* is used in connection with the first part. Historical references are employed, but the main aim is a rational interpretation of existing society, and ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements and other sociological questions of present interest.

The class is supplied with a list of about fifty topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

The Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The choice of topics, however, depends much upon the individual capacity and preference of the students. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. It is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, throughout the year.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient.—*First and second semesters.*

INDUSTRY AND COMMERCE

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States.

The latter part is occupied with studies in the industries connected with American agriculture, forestry and mining.—*Three hours a week, first semester.*

The Manufactures of the United States.

The history, methods, present location and condition of our chief manufacturing industries will be presented, the relation of these industries to one another, and to sources of raw materials, means of transportation, market facilities, and foreign trade.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, which are engaged in producing time, place, and quantity utility.

a. The Distribution of Agricultural Products.

Two hours a week, first semester.

b. The Manufacturer's Problem of Distribution.

Two hours a week, second semester.

c. Wholesale and Retail Trade.

Two hours a week, second semester.

Seminary in Economics.

Topic for 1907-1908, Economic characteristics of certain foreign countries; studies in types of national economy.

Professor GLOVER:—

Mathematics of Insurance.

In connection with the course in Higher Commercial Education six courses are offered upon the actuarial phases and technique of insurance. The theory of the valuation of securities is also presented. For students in this line a statistical laboratory equipped with all necessary computing machines is available. For further information regarding courses in insurance see this Announcement under Mathematics.

A course of lectures on Insurance Law given in the Law Department is open to students in the Department of Literature, Science, and the Arts by special arrangement.

Summer Session, 1908

Professor TAYLOR:—

Money and Banking.

Text-book and lectures. The time of this course will be divided between Money and Banking in about the ratio of 2 to 1. The work in each subject will include both theory and history. On the historic side the experience of our own country will naturally receive most attention. The student will need Taylor's Chapters on Money.

Professor VEDITZ:—

Principles of Sociology.

This course will be similar in character to the course given under the same title in the regular session.

American Social Problems.

A course covering somewhat the same ground as the course called Problems in Sociology, given in the regular session.

PHILOSOPHY

The advanced courses described below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

For the provisions in regard to the fellowship in philosophy, see page 25.

A. SEMINARIES

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD, Mr. SELLARS and Dr. EMERSON.

History of Philosophy, Professor LLOYD, Mr. SELLARS.

Ethics, Professors WENLEY and LLOYD, Mr. SELLARS and Dr. EMERSON.

Modern Systems, Professors WENLEY and LLOYD, Mr. SELLARS and Dr. EMERSON.

Ancient Philosophy, Professors WENLEY and REBEC and Mr. SELLARS.

Philosophy of Religion, Professor WENLEY and Mr. SELLARS.

Æsthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD, Mr. SELLARS and Dr. EMERSON.

Logic, Professor REBEC and Mr. SELLARS.

Psychology, Rational, Experimental and Pathological. Professors PILLSBURY and BARRETT, Dr. SHEPARD.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been shelved in the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY

Professor WENLEY:—

***The Philosophy of Kant.**

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

***The Philosophy of Hegel.**

Study of the Logic and discussions.—*Two hours a week, second semester.*

Professor LLOYD:—

***Philosophy since Hegel.**

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Mr. SELLARS:—

***Contemporary Metaphysics.**

Two hours a week, first semester.

Professor REBEC:—

***American Ideas.**

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

C. ETHICS

Mr. SELLARS:—

***Aristotle's Ethics.**

Collateral reading and theses.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

D. PSYCHOLOGY

The Psychological Laboratory is well equipped for original investigation; and its facilities have been recently improved by removal to new quarters See page 20.

Professors PILLSBURY and BARRETT, Dr. SHEPARD:—

Original Investigation.

Hours as may be assigned, throughout the year.

Professor PILLSBURY:—

Apperception.

Two hours a week, first semester.

Psychology of the Abnormal and Occult.

Two hours a week, first semester.

Genetic Psychology.

Two hours a week, second semester.

Dr. SHEPARD:—

Psycho-Physical Methods.

Two hours a week, second semester.

E. SPECIAL COURSES

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

Professor LLOYD:—

Political Philosophy.

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1907-1908 to the question of the possibilities of a realistic expression.—*Two hours a week, throughout the year.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1907-1908 to the philosophy of evolution.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

Professor REBEC:—

Æsthetics.

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

Philosophy of Discourse.

Two hours a week, second semester.

Dr. EMERSON:—

Pragmatism.

Two hours a week, first semester.

Summer Session, 1908

Professor WENLEY:—

Seminary in Ethics.

Professor LLOYD:—

Seminary in History of Philosophy.

The work of this seminary will be arranged according to the requirements of students who elect it.

Professor REBEC:—

Seminary in Æsthetics.

Primary regard will be had, in this course, to the needs of students pursuing æsthetics as one of their subjects for a higher degree; however, as such persons will commonly be students *in absentia*, whose chief need will be to have problems intelligently raised for them, and broad outlines of work sketched out, with solutions only broadly indicated, the work of the course cannot be too narrowly specialized or even technical.

Professor PILLSBURY:—

Experimental Psychology.

For graduates and undergraduates. An introduction to experimental methods, with the repetition of classical experiments. Special emphasis will be placed on methods that can be applied in school practice. The work may be divided to suit the needs and attainments of the individual student.

EDUCATION

Hereafter the History of Education (Courses I and II in the general announcement or their equivalent) will be required as prerequisite for graduate study in this department. In special cases students may be permitted to pursue graduate work simultaneously with the preliminary courses.

Professor WHITNEY:—

Social Education.

This course embraces a consideration of the school as a social factor in its relation to the child, the home, the state and the church. Also a discussion of the relation of education to vocation and crime. Lectures and recitations.—*Two hours a week, second semester.*

Comparative School Systems.

This course designs to present the essential features of the school systems of the United States, England, Germany, and France, to compare these systems with each other, and to judge of the efficiency of each in the light of their respective educational aims and national ideals. Among the topics treated are organization, supervision, curriculum, methods of teaching, continuation schools, technical schools, Universities, etc. Lectures, prescribed readings and reports.—*Tuesday and Thursday at 3.*

Assistant Professor KING:—

The Psychology of Education.

A critical survey of the psychological literature bearing upon education, with reference to determining and working out in the latter part of the course a more systematic and useful presentation of the subject. Special opportunities for constructive and original work in various problems as well as for experimental studies.

Psychology of Childhood and Adolescence.

A research course in various problems of physical and mental growth from the viewpoint of education. The problems, methods and value of genetic psychology, especially in secondary education, will be studied and discussed.

Problems in Contemporary Secondary Education.

A seminary for special investigation of various problems relating to the origin, development, educational values and organization of the curriculum; the school as a social institution, and the sociological principles underlying modern educational practice.

Assistant Professor JOHNSTON:—**Educational Theories of the Greeks.**

Introductory lectures on early Greek conceptions of nature and of mind; actual systems of education at Sparta and at Athens; educational importance of the Sophists; Xenophon's education of Cyrus, and his *Memorabilia* of Socrates; Plato's *Apology*, *Crito*, *Phaedo*, and *Protagoras*. A more detailed study of the text of Plato's *Republic*, and of selections from Aristotle's *Ethics* and *Politics* in translation will constitute the recitation work of the course. The course will end with several lectures on the Alexandrian period, Dickinson's *Greek View of Life*, Plato's *Republic*, and Burnet's *Aristotle on Education*.—*Two hours, first semester.*

Educational Reformers.

A study of the distinctive contributions to educational theory and practice of such pioneers in education as Rousseau, Kant, Spencer, Pestalozzi, Herbart, Montaigne, and Horace Mann. Lectures, selected readings, and reports.—*Two hours, second semester.*

Course of Study.

The theoretical justification of the course of study. An examination into the peculiar educational significance and function of selected subjects from the high school curriculum; the proposed additions and eliminations, and the theory of correlation. Lectures, assigned readings, frequent reports.—*Two hours, second semester.*

The Education of Feeling.

The design of this course is to treat, both historically and constructively, the subject of the training of the feelings in education. A review of the attitudes of Oriental Nations, Greeks, Romans, Scholastics, Renaissance educators, and modern theorists will constitute the historical portion of the work. A consideration of typical, philosophical and psychological attitudes toward the problem will follow this historical survey. The attempt will then be made to construct some workable concept of the relation between the so-called elementary feelings and the complex esthetic, ethical and religious emotions. The course will finally seek to emphasize the necessity of some recognition in educational method and incorporation in educational theory of definite emotional training. If possible, the psycho-pathology of feeling will receive some treatment. Lectures, prescribed reading, and thesis. Students without considerable preparation in philosophy, psychology and education are not advised to undertake the work.—*Hours to be arranged after consultation with the instructor, first semester.*

Philosophy of Education.

The purpose of this course is to pass in review distinctive contributions to the solution of educational problems. The treatment of topics chosen will approximate the following order: Introductory discussion of the different legitimate aspects of the educative process; a summary account of representative contemporary practical issues which call for theoretical solution; and a more detailed treatment of the practical, historical, biological, and psychological aspects of education. This course is intended to prepare the student for the second semester's work, which supplements the work here outlined by offering the more complex and equally essential philosophical considerations involved. Lectures, selected readings, recitations, and reports.— *Two hours, first semester.*

Philosophy of Education.

Students enrolling in this course must have had the course above or its equivalent. The aim of the work will be to continue the above by presenting the economic and sociological, the esthetic, the religious, and the philosophical aspects of education insofar as they may be clearly distinguishable or interrelated. The combined purpose of the two courses is to equip the student with such serviceable educational concepts as will enable him to orient himself safely in the modern literature of educational theory. Lectures, assigned readings, and reports.— *Two hours, second semester.*

Summer Session, 1908

Assistant Professor KING:—

Psychology of Education.

In this course is presented in systematic form the hitherto scattered material of psychology as related to education; with reference to such topics as the following: The nature of education from a psychological point of view; mental growth as conditioned by self-activity; the solution of a problem as a typical condition for true self-activity; the educational significance of the *problem* or *purpose*; the interpretation of various mental processes and categories from the viewpoint of the problem-solving activity; review of various experimental studies upon learning; educational psychology as social psychology; the importance of the interaction of minds as a condition of mental growth.

The Psychology of Childhood and Adolescence.

A discussion of selected problems from various periods of mental development, with especial reference to the practical problems of teacher and superintendent.

Problems in Secondary Education.

The topics considered will be as follows: (a) problems growing out of the age of the pupil; (b) problems relating to the curriculum, its evolution, its psychology, its educational values, its organization and administration; (c) problems growing out of the fact that the high school is a social institution, with certain relations to society at large and to other educational agencies.

Assistant Professor JOHNSTON:—

Philosophy of Education.

The purpose of this course is to outline and to examine briefly the distinguishable aspects of the educative process. The points of view will be taken up in the following order: the practical, economic, historical, biological, psychological, sociological, esthetic, religious, and philosophical aspects of education as a permanent institution of society. The results of the survey outlined above will be summed up at the end of the work. The course is planned for those students who desire sufficient acquaintance with educational theory to enable them to read critically the modern literature on the subject. This course is practically equivalent to Course 6 in the University Catalog.

Educational Reformers.

A study of the distinctive contributions to educational theory and practice of such pioneers in education as Rousseau, Kant, Spencer, Pestalozzi, Herbart, Montaigne, and Horace Mann. Lectures, selected readings, and reports.—*Two hours, second semester.*

Educational Theories of the Greeks.

Introductory lectures on early Greek conceptions of nature and of mind; actual systems of education at Sparta and at Athens; educational importance of the Sophists; Xenophon's education of Cyrus, and his *Memorabilia* of Socrates; Plato's *Apology*, *Crito*, *Phaedo*, and *Protagoras*. A more detailed study of the text of Plato's *Republic*, and of selections from Aristotle's *Ethics* and *Politics* in translation will constitute the recitation work of the course. The course will end with several lectures on the Alexandrian period. Dickinson's *Greek View of Life*, Plato's *Republic*, and Burnet's *Aristotle on Education*.—*Two hours, first semester.*

MATHEMATICS

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

A. FOR UNDERGRADUATES AND GRADUATES

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—

Advanced Mechanics.

Kinetics of the rigid body; motion about a fixed point; the problem of the top; relative motion; D'Alembert's equations; general principles of mechanics.—*Three hours a week, second semester.*

Professor MARKLEY:—

Projective Geometry.

This course begins with the geometry of position, Reye's work being used as a text, which is followed by the analytic treatment, including homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Professor GLOVER:—

Higher Algebra.

The more important topics to be considered in this course are: symmetric functions of the roots, resultants, solution of a system of n linear equations, theorems concerning integral functions of one and two variables, and elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Dr. PIERCE:—

Elementary Theory of Differential Equations.

A lecture course with references to available literature on the subject. Particular attention will be given to the ideas of Lie.—*Three hours a week, either first or second semester.*

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES

Professor BEMAN:

Advanced Differential and Integral Calculus.

Goursat's *Cour d'analyse mathématique*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Newtonian attraction; Newtonian and logarithmic potentials; the equations of Laplace and Poisson; harmonic functions; the principle of Dirichlet; the problems of Green and Dirichlet and the Green function.—*Three hours a week, first semester.*

Harmonic Analysis.

The partial differential equations of mathematical physics; Fourier series; the Fourier integral; spherical harmonics; Bessel functions; the problem of boundary values for partial differential equations.—*Two hours a week, throughout the year.*

Geometrical Calculus.

The geometry of Grassmann and Peano; Gibbs's vector analysis; scalar and vector fields.—*Two hours a week, first semester.*

Professor MARKLEY:—

Theory of Functions.

The first part of this course deals with functions of a real variable including a development of the fundamental ideas of irrational numbers, continuity and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometric representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Rieman, and Wierstrass.—*Three hours a week, throughout the year.*

Theory of Functions. [Advanced Course.]

This course is a direct continuation of the preceding. It includes the theory of elliptic functions.—*Two hours a week, throughout the year.*

Professor GLOVER:—

Seminary in the Theory of Probabilities and Insurance.

This course is designed for graduate students who wish to study some of the more advanced problems in the theory of probabilities, with applications to the theory of mathematical statistics. The following subjects will be considered: direct and

inverse probability, theory of mathematical risk, theory of the law of error, Lexis's theory of population, old age pensions, sickness insurance, Pearson's method of moments, theory of correlation, graduation of mortality and sickness tables, theory of selection, and distribution of surplus.—*Hours to be arranged, throughout the year.*

Dr. FORD:—

Infinite Series and Products.

Two hours a week, throughout the year.

Summer Session, 1908

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in mathematics along lines best suited to their needs. Such work when satisfactorily completed will be accepted as a partial fulfillment of the residence requirements for such degree. The courses offered below are considered well adapted to the greater number.

FOR GRADUATES AND UNDERGRADUATES

Professor BEMAN:—

Differential Equations.

An elementary course in ordinary differential equations.
Text-book: Johnson's Differential Equations.

Professor MARKLEY:—

Projective Geometry.

Lectures and assigned reading and recitations in text-book.

Theory of Functions.

Lectures and assigned reading and recitations.

Those desiring to take this work are requested to correspond with the instructor in charge.

ASTRONOMY

Professor HUSSEY and Assistant Professor CURTISS.

Practical Astronomy.

The elements of Spherical Astronomy. Theory of the sextant and transit and their use in the solution of practical problems, including determination of instrumental constants, time, latitude, longitude, and azimuth.—*Two hours, second semester.*

Advanced Practical Astronomy.

Studies in Spherical Astronomy. Theory of the equatorial and its use in observational work, illustrative of the best modern practice. Reduction of measurements. Open to those who have had the preceding course or its equivalent.—*Two hours, first semester.*

Theoretical Astronomy.

The elements of Celestial Mechanics, and theory and practice in the determination of parabolic and elliptic orbits. A knowledge of Integral Calculus is required.—*Three hours, first semester.*

Advanced Theoretical Astronomy.

Definite determination of orbits. Comparison and adjustment of observations. Theory of Interpolation, Mechanical Quadrature, Special and General Perturbations. The selection of topics will be determined somewhat by the needs of those taking the course.—*Hours and credit to be arranged, second semester.*

Theory of Errors.

Theory of the comparison and adjustment of observational data according to the Method of Least Squares. Construction and discussion of empirical curves in the solution of experimental problems.—*Two hours, first semester.*

History of Astronomy.

The History of Astronomy from the time of Newton, but treating especially of the development of the science during the past century. The course presupposes a general knowledge of Descriptive Astronomy.—*Two hours, first semester.*

Astrophysics.

Introductory descriptive course. The principles of spectroscopy and bolometry. General treatment of methods and results, having reference especially to the interpretation of solar and stellar phenomena. The course presupposes a general knowledge of Descriptive Astronomy, Physics, and Calculus.—*Two hours, second semester.*

Variable Star Studies.

Lectures at the University, devoted particularly to the recent development of the subject along photometric and spectroscopic lines, and theoretical and observational work at the Observatory.—*Two hours, first semester.*

Summer Session, 1908**Professor HUSSEY:—****Practical Astronomy.**

Theory of the sextant and transit and their use in the solution of practical problems, including determinations of instrumental constants, time, latitude, longitude, and azimuth. Recitations in Room 22, U. H., at 11, during the first four weeks of the term; laboratory work at the Observatory, partly in the afternoon and partly in the evening, throughout the term.

Theoretical Astronomy.

The elements of Celestial Mechanics and theory and practice in the determination of parabolic and elliptic orbits. Integral Calculus is a pre-requisite.

PHYSICS

The courses announced below presuppose about one and a half years' collegiate work in physics, viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Electrochemistry, Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Professor CARHART:—**Alternating Electric Currents.**

An intermediate course based on Franklin & Williamson's *Alternating Electric Currents*.—*Three hours a week, first semester.*

Professor CARHART and Assistant Professor HENDERSON:—**Electrochemistry.**

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.—*Four hours a week, second semester, including laboratory work.*

Professor REED:—

The Theory of Sound.

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—Lectures, *two hours a week*; laboratory work, *twice a week, first semester*.

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—Lectures and recitations, *two hours a week*; laboratory work, *twice a week, second semester*.

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester*.

Professor PATTERSON:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distribution, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week, first semester; twice a week, second semester*.

NOTE: For courses in Applied Electricity, see Electrical Engineering in the Announcement of the Department of Engineering. Seventeen courses in all are there described in detail. They cover the theory, testing and design of electric machinery, transformers, lamps, storage batteries, telegraphy, telephony, electric distribution, power plants, railways, etc. Many of these courses, for example, those in dynamo-electric machinery (both direct and alternating current), in alternating current phenomena, etc., have frequently been accepted toward advanced degrees.

Assistant Professor RANDALL:—**Laboratory Work in Heat.**

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, either semester.*

Measurements of High Temperature.

In this course opportunity is offered to work with gas-thermometer, thermo-element and resistance thermometer.—*Once a week, either semester.*

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations *two hours a week, second semester.* This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of those principles to numerous problems in physics and chemistry.

Assistant Professor SMITH:—**Electrical Measurements.**

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *two or three times a week, first semester*; *three times a week, second semester.*

Professors CARHART and REED:—**Physical Colloquium.**

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

Summer Session, 1908

Graduate students qualified to enroll for a higher degree will be afforded an opportunity to do work in Physics in the direction best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number.

Professor REED:—**Sound and Other Oscillatory Phenomena.**

This course includes the study of the origin, propagation and phenomena of sound; the differential equations of motion for systems having one and two degrees of freedom; the characteristic phenomena of free, forced, and damped vibrations; resonance; applications of Fourier's series to specific cases; theory of electric oscillations; stationary electric waves; electric resonance and tuning. Lectures, laboratory work and reading.

Theory of Light.

The aim of this course is to present to the student an intelligent account of the fundamental facts in modern optics. A brief treatment of geometrical optics is followed by the study of the phenomena of interference, diffraction, dispersion, absorption and polarization from the theoretical and experimental standpoints. The large equipment of the laboratory in optical apparatus renders the work in this line especially attractive. Text-book: Preston's Theory of Light.

PRIMARILY FOR GRADUATES**Advanced Work in Light.**

Laboratory work and reading, for students qualified to pursue independent investigation. Text-book: Mann's Advanced Optics.

Advanced Work in Sound.

Laboratory work and reading along some line of research work involving acoustic or electric vibrations.

FOR GRADUATES AND UNDERGRADUATES**Assistant Professor RANDALL:—****Theory of Heat.**

Recitations and reading. Text-book: Preston's Theory of Heat.

Laboratory Work in Heat.

This course corresponds to the regular Course 8. It is offered for those who wish to become acquainted with the more advanced methods for measurements in heat. The course includes measurements of the expansion of solids, liquids, and gases, the specific heat of liquids and gases, vapor tensions, and thermal conductivities.

Measurements of High Temperatures.

This course corresponds to the regular Course 17. Opportunity is offered to work with the gas thermometer, thermo-element, and resistance thermometer.

Assistant Professor SMITH:—

Electrical Measurements.

Recitations at 8, laboratory work daily two hours. This course corresponds to the regular Course 5 in physics and includes measurements of resistance, electromotive force, current, capacity, self and mutual induction, and a study of the magnetic properties of iron and steel. Text-book: Carhart and Patterson's Electrical Measurements.

Advanced Electrical Measurements.

Continuation of the preceding course. Laboratory work and reading, daily, at hours to be arranged.

CHEMISTRY

Resident graduates may enter upon any of the courses in chemistry in this University for which they are qualified. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to Courses 1, 2, 3, 5 and 7 (University Calendar for 1907-1908), making in all about twenty-five hours of undergraduate credit.* If chemistry is taken as a minor subject by a student registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1, 2 and 3.

Graduate students who are not candidates for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during one semester.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for the convenience of readers.

Professor JOHNSON:—

Advanced Qualitative Analysis.

Following undergraduate Course 3 (University Calendar for 1907-1908).

Professor CAMPBELL:—

Chemical Colloquium.

The Chemical Colloquium meets twice a month. Each member of the teaching staff has an opportunity to present at some meeting during the year an account of recent research work in the field in which he is particularly interested.

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1907-1908) or its equivalent. Laboratory work, directed by lectures, in some chosen field of analytical research.

Research in Chemical Technology.

(In conjunction with Professor WHITE).

The laboratory is equipped for research along the following lines.

1. Influence of heat and mechanical treatment on the constitution of iron and steel.
2. Manufacture of Portland cement with special reference to the influence of composition and temperature of burning upon the physical properties of the finished cement.
3. Destructive distillation of coal, with special reference to the manufacture of gas.
4. Electrometallurgy and applied electrochemistry.
5. Gas analysis, calorimetry and photometry.
6. Assaying of gold and silver ores and research in the technical treatment of ores.

Professor GOMBERG:—

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, the first semester.*

Seminary in Special Topics in Organic Chemistry.

Following undergraduate Course 7 (University Calendar for 1907-1908) or its equivalent.—*Two times a week, second semester.*

Summer Session, 1908**Professor KRAUS:—****Graduate Course.**

Laboratory work and reading adapted to the needs of graduate students competent to enroll for a higher degree. The work may involve the measurement and projection of crystals, chemical crystallography, or the formation and origin of minerals.

GEOLOGY

The courses in Geology which are arranged for graduate students presuppose a knowledge of the general principles of geology and of mineralogy. The courses in Elements of Geology (1 or 1a) and Historical Geology (2a) or their equivalents are assumed to have been already taken in course. For students who plan to become teachers of geology, or to engage in research work, it is a distinct advantage for them as undergraduates to map out their courses of study. Inorganic chemistry and physics, including the principles of mechanics, are regarded as basal studies for any long course in geology; and these courses should, so far as is possible, be taken up early in the undergraduate study and to be followed by a year's work in mineralogy. Sufficient French and German to enable the student to read with ease the scientific literature of the subject should, if possible, be acquired before graduation. A knowledge of elementary surveying will greatly aid the student in his geological studies and may be supplemented by the course in Field Geology of the spring semester.

For the graduate and other courses of the geological department the collections of rocks and fossils which are on exhibition in the museum or stored in the cases of the geological laboratory, are made available for purposes of instruction, and in the case of advanced students for research work. At the observatory (see page —) are to be installed a number of modern seismographs which will be used to illustrate the courses in seismic geology. The new Israel C. Russell Seminary Room, with its series of journals, maps, survey reports, etc., and especially its collection of geological and geographical brochures, is supplemented by the large collection of geological and geographical journals in the University Library.

The graduate courses now offered by the department are in the lines of tectonic, seismic and paleontologic geology, but it is expected that other courses will be added in the near future. Research work along the lines indicated is especially encouraged, and students may elect geology either as a major or a minor subject for a higher degree (see page 8). For the degree of Master of Arts a minimum of thirteen credit hours of geological work is required when the subject is elected as a major, and six hours when elected as a minor.

FOR UNDERGRADUATES AND GRADUATES

Professor HOBBS:—

Seismic Geology.

A study of earthquakes from both the geological and geophysical sides. The great importance which seismology has assumed within the last few years is the warrant for its separate treatment in departments of geology. The distribution of seismicity over the globe, and within special provinces, the methods of locating lines of special danger from earthquakes, the mitigation of their disastrous consequences, the "distant" study of greater earthquakes, and the use of earthquake instruments, will all be included in the course.—*Two hours a week, first semester.*

Assistant Professor CASE:—

Geological Evidences of Evolution.

A lecture course giving an account of the origin and development of the animals which lived in past time and describing the ancestral forms with the lines of descent of the more important domestic and wild animals. The more important forms of invertebrate life will be discussed in the same way.—*Three hours a week, first semester.*

Mr. SCOTT:—

Physiography.

A general course in physiography having special reference to the needs of the teachers of science in secondary schools. Excursions weekly on Saturday mornings during the open season.—*Three hours, first semester.*

Field Geology.

A study of the methods of field mapping in geology. Each student equipped with simple instruments will prepare a series of topographic maps of diversified districts in the vicinity of Ann Arbor, and enter upon them the distribution of the glacial formations represented.—*Three hours, second semester.*

Professor HOBBS, Assistant Professor CASE, Mr. SCOTT.

Current Literature of Geology.

All advanced students of the department will meet weekly for reports and discussion of the recent literature of geology. These reports will be replaced occasionally by the presentation of the results of research work undertaken by members of the department or advanced students.—*One hour, both semesters, without special credit.*

PRIMARILY FOR GRADUATES

Professor HOBBS:—

Tectonic Geography.

The field of study covered by this course lies upon the mutual frontier of structural geology and physiography. The purpose of the course is to study the relations of earth features to the structural planes within the underlying rock basement. The characteristics of each of the better known districts of the globe will be in turn discussed, and students will be expected to gather data from original sources. Lectures, practical exercises, and library study.—*Two hours, second semester.*

Advanced Seismic Geology.

This course takes up the subject of earthquakes as a continuation of the course in seismic geology, and is conducted partly by lectures and partly through the direction of individual research by members of the class.—*Three hours, second semester.* Given in alternate years beginning with 1909.

Assistant Professor CASE:—

Systematic Invertebrate Paleontology.

A course dealing with the chief forms of invertebrate fossils both from the organic standpoint of origin and development, and from the faunistic side as indicators of the different geological formations. Lectures and laboratory work.—*Five hours, first semester.*

Vertebrate Paleontology.

A course treating of the development of vertebrate life and structure. The subject is treated both as a study in evolution, and as an aid in interpreting past conditions through the adaptive radiation and migration of faunas.—*Five hours, second semester.* Given in alternate years, beginning in 1909.

Professor HOBBS, Assistant Professor CASE:—

Research Work.

The department directs research work along the lines of seismic and tectonic geology and vertebrate paleontology.

Summer Session, 1908

Assistant Professor CASE:—

Teachers' Course in Physiography.

A course especially adapted for teachers and students of physical geography, involving a discussion of the methods by which earth features have been developed, and including an account of the atmosphere and the use of various instruments, maps, weather charts, etc., available for teaching. Lectures or recitations daily with excursions on Saturday.

The Development of the Continent of North America.

An outline course treating of the building of the continent with descriptions of the deposits of its different geological epochs. The general geography, climate, forms of life, etc., will be taken up under each formation. Daily lectures or recitations.

ZOOLOGY

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on page 17. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work may include research.

For the doctor's degree a minor in zoology involves about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptations. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours, first semester, five hours, second semester.*

Organic Evolution. •

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Assistant Professor NEWMAN:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the

unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures or recitations per week.—*Two hours, second semester.*

Heredity.

This course gives exposition and critical discussion of the results of recent investigations in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that it be preceded by the course in Organic Evolution. This course should be of value to students specializing in sociology, psychology, medicine and law, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Short Course in Zoology.

This course aims to present, in brief outline, by means of a text-book, the more important facts concerning the animal kingdom and to illustrate them by specimens. It thus gives a bird's-eye view of the whole subject not possible in the more special courses. It is especially designed for forestry students, but may be taken by any student who has taken the first semester work in general biology.—*Three hours, second semester.*

Dr. CASTEEL:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.—*Five hours, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or physiology. Laboratory work, lectures, and quizzes.—*Four hours, second semester.*

Entomology.

A course in the habits, life histories and structure of insects. While seeking to acquaint the student with insect life and structure in general, the course is especially adapted to meet the needs of forestry students and those particularly interested in the economic phases of entomology.—*Three hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Three hours, throughout the year.*

Dr. GLASER:—

Embryology of Vertebrates.

This course aims to give an introduction to the principles of embryological science as illustrated by the development of vertebrates. The lectures will be comparative; the laboratory work, largely on the organogeny of the chick, will be supplemented by demonstrations of other embryos. Considerable attention will be

Organic Synthesis and Ultimate Analysis.

(In conjunction with Dr. CONE).

Laboratory work.

Investigation in Organic Chemistry.

(In conjunction with Dr. CONE).

Professor SCHLOTTERBECK:—**Phytochemical Research.**

Laboratory investigation of the chemical constitution of alkaloids and other principles of plants of related species.

Food and Drug Analysis.

Laboratory work in analytical methods for the control of food and drugs.

Advanced Microscopy.

Laboratory work in microscopical methods for the control of food and drugs.

Professor BIGELOW:—**Physical and Theoretical Chemistry.**

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—Lectures, *four hours a week, second semester.*

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Laboratory Research in Physical and Electrochemistry.**Professor STEVENS:—****Drug Assaying, and Pharmacopœial Standards.**

Laboratory work.

Professor WHITE:—**Chemical Technology.**

Lectures on the main chemical industries, inorganic in the *first semester*, and organic in the *second semester*. Among the subjects treated are utilization of fuel, purification of water, the alkali and acid industries, electrochemistry, cement, wood and coal distillations, sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Research in Chemical Technology.

(In conjunction with Professor CAMPBELL, as given above).

Assistant Professor LICHTY:—

Laboratory Work with the Polariscopes and the Spectroscopes.

Laboratory Research in Inorganic Chemistry.

Mr. SMEATON:—

History of Chemistry.

Lectures and historical reading, covering the history of the science from the beginning to 1860.—*Two hours a week, second semester.*

Laboratory Research in Cryoscopic Methods.

Dr. HALE:—

Laboratory Research in Organic Chemistry.

Stereochemistry, including a General Study of Isomerism.

Lectures, *twice a week, second semester.*

The Heterocyclic Derivatives in Organic Chemistry.

Lectures, *twice a week, second semester.*

[This course alternates with the course in Stereochemistry.]

Dr. CONE:—

The Chemistry of Organic Dyes.

Lectures, and reading, *twice a week, first semester.*

Organic Synthesis and Ultimate Analysis.

(In conjunction with Professor GOMBERG, as given above).

Investigation in Organic Chemistry.

(In conjunction with Professor GOMBERG, as given above).

Mr. ZIMMERSCHIED:—

Quantitative Analysis.

Laboratory work.

Micrometallography.

Lectures and laboratory work.—*Second semester only.*

Dr. LIND:—

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and the Phase Rule.—Lectures, *two hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies of solutions, dissociation, conductivity, etc.—*Four times a week, both semesters.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposition potentials, etc.—*Two lectures a week.*

Thermometry.

Calibrations and high temperature measurements by all standard methods.—*One lecture and one laboratory period a week.*

Theory and Practice of Exact Measurement,

with laboratory practice in glass blowing, calibration, and construction of apparatus.—*One lecture and two laboratory periods.*

Summer Session, 1908

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in Chemistry along the lines best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number.

Dr. CONE:—

Organic Preparations.

Laboratory work daily, with reference reading and quiz upon synthetic principles. Ultimate analysis may be included.

Mr. SMEATON:—

Recent Theory Bearing on Analytical Chemistry.

Lectures following in outline Ostwald's Scientific Foundations of Analytical Chemistry.

Dr. LIND:—

Elementary Theoretical and Physical Chemistry.

Lectures and recitations. The most essential theories and principles underlying the science of chemistry are discussed and their bearing on some of the usual chemical operations illustrated. Among the topics treated are: The gas laws; Avogadro's hypothesis; the determination of molecular weights; the theory of solutions, including osmotic pressure, electrical conductivity, and the ionic dissociation theory; law of mass action.

Physical-chemical Measurements (Laboratory).

The following determinations are made: Vapor density by the methods of Victor Meyer, Bleier and Kohn, and Dumas; molecular weight measurements by freezing point and boiling point methods; electrical conductivity.

MINERALOGY AND PETROGRAPHY

The following courses in mineralogy and petrography are adapted to the needs of graduate students. All courses presuppose a knowledge of general inorganic and analytical chemistry, as well as the principles of geology. For the course in physical crystallography some knowledge of light is essential.

Professor KRAUS and Mr. HUNT:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution, and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—*Lectures five times a week, laboratory work five hours a week, first semester.*

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential.—*Laboratory work, nine hours a week, first or second semesters.*

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, formation and origin of minerals.

Mr. HUNT:—

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by means of the physical properties, a very large number of minerals.—Laboratory work, *six hours a week, first or second semesters.*

Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first or second semesters.*

Mr. HORE:—

Lithology.

The lectures include, aside from a review of the rock-forming minerals, a discussion of the classification, origin, and methods of determination of the more important rocks. In the laboratory the student is required to determine by means of the macro-physical properties a large number of rock specimens. Numerous field excursions will be made in order to acquire facility in the rapid determination of rocks in the field.—*Two lectures and two hours laboratory work a week, first or second semesters.*

Petrography.

In this course the microscopic structure and mineralogical composition, classification, origin, and determination of the igneous and metamorphic rocks are discussed.—*Two lectures and three hours laboratory work a week, first and second semesters.*

Professor KRAUS:—

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic-optical instruments.—*Two lectures and two hours laboratory work a week, second semester.*

Current Literature of Mineralogy.

The instructors and advanced students meet once a week to discuss important current and classic literature.—*Second semester.*

Summer Session, 1908**Professor KRAUS:—****Graduate Course.**

Laboratory work and reading adapted to the needs of graduate students competent to enroll for a higher degree. The work may involve the measurement and projection of crystals, chemical crystallography, or the formation and origin of minerals.

GEOLOGY

The courses in Geology which are arranged for graduate students presuppose a knowledge of the general principles of geology and of mineralogy. The courses in Elements of Geology (1 or 1a) and Historical Geology (2a) or their equivalents are assumed to have been already taken in course. For students who plan to become teachers of geology, or to engage in research work, it is a distinct advantage for them as undergraduates to map out their courses of study. Inorganic chemistry and physics, including the principles of mechanics, are regarded as basal studies for any long course in geology; and these courses should, so far as is possible, be taken up early in the undergraduate study and to be followed by a year's work in mineralogy. Sufficient French and German to enable the student to read with ease the scientific literature of the subject should, if possible, be acquired before graduation. A knowledge of elementary surveying will greatly aid the student in his geological studies and may be supplemented by the course in Field Geology of the spring semester.

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The graduate courses now offered by the department are in the lines of tectonic, seismic and paleontologic geology, but it is expected that other courses will be added in the near future. Research work along the lines indicated is especially encouraged, and students may elect geology either as a major or a minor subject for a higher degree (see page 8). For the degree of Master of Arts a minimum of thirteen credit hours of geological work is required when the subject is elected as a major, and six hours when elected as a minor.

FOR UNDERGRADUATES AND GRADUATES

Professor HOBBS:—

Seismic Geology.

A study of earthquakes from both the geological and geophysical sides. The great importance which seismology has assumed within the last few years is the warrant for its separate treatment in departments of geology. The distribution of seismicity over the globe, and within special provinces, the methods of locating lines of special danger from earthquakes, the mitigation of their disastrous consequences, the "distant" study of greater earthquakes, and the use of earthquake instruments, will all be included in the course.—*Two hours a week, first semester.*

Assistant Professor CASE:—

Geological Evidences of Evolution.

A lecture course giving an account of the origin and development of the animals which lived in past time and describing the ancestral forms with the lines of descent of the more important domestic and wild animals. The more important forms of invertebrate life will be discussed in the same way.—*Three hours a week, first semester.*

Mr. SCOTT:—

Physiography.

A general course in physiography having special reference to the needs of the teachers of science in secondary schools. Excursions weekly on Saturday mornings during the open season.—*Three hours, first semester.*

Field Geology.

A study of the methods of field mapping in geology. Each student equipped with simple instruments will prepare a series of topographic maps of diversified districts in the vicinity of Ann Arbor, and enter upon them the distribution of the glacial formations represented.—*Three hours, second semester.*

Professor HOBBS, Assistant Professor CASE, Mr. SCOTT.

Current Literature of Geology.

All advanced students of the department will meet weekly for reports and discussion of the recent literature of geology. These reports will be replaced occasionally by the presentation of the results of research work undertaken by members of the department or advanced students.—*One hour, both semesters, without special credit.*

PRIMARILY FOR GRADUATES

Professor HOBBS:—

Tectonic Geography.

The field of study covered by this course lies upon the mutual frontier of structural geology and physiography. The purpose of the course is to study the relations of earth features to the structural planes within the underlying rock basement. The characteristics of each of the better known districts of the globe will be in turn discussed, and students will be expected to gather data from original sources. Lectures, practical exercises, and library study.—*Two hours, second semester.*

Advanced Seismic Geology.

This course takes up the subject of earthquakes as a continuation of the course in seismic geology, and is conducted partly by lectures and partly through the direction of individual research by members of the class.—*Three hours, second semester.* Given in alternate years beginning with 1909.

Assistant Professor CASE:—

Systematic Invertebrate Paleontology.

A course dealing with the chief forms of invertebrate fossils both from the organic standpoint of origin and development, and from the faunistic side as indicators of the different geological formations. Lectures and laboratory work.—*Five hours, first semester.*

Vertebrate Paleontology.

A course treating of the development of vertebrate life and structure. The subject is treated both as a study in evolution, and as an aid in interpreting past conditions through the adaptive radiation and migration of faunas.—*Five hours, second semester.* Given in alternate years, beginning in 1909.

Professor HOBBS, Assistant Professor CASE:—

Research Work.

The department directs research work along the lines of seismic and tectonic geology and vertebrate paleontology.

Summer Session, 1908

Assistant Professor CASE:—

Teachers' Course in Physiography.

A course especially adapted for teachers and students of physical geography, involving a discussion of the methods by which earth features have been developed, and including an account of the atmosphere and the use of various instruments, maps, weather charts, etc., available for teaching. Lectures or recitations daily with excursions on Saturday.

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An outline course treating of the building of the continent with descriptions of the deposits of its different geological epochs. The general geography, climate, forms of life, etc., will be taken up under each formation. Daily lectures or recitations.

ZOOLOGY

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on page 17. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work may include research.

For the doctor's degree a minor in zoology involves about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major, will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related is work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

A. FOR GRADUATES AND UNDERGRADUATES

Professor REIGHARD:—

Vertebrate Zoology.

The structure, classification, distribution, and habits of vertebrate animals. Lectures with practical work in field and laboratory. The field work will be definitely planned and regularly carried out, and will include observations of the habits of the native fishes, amphibia, reptiles, birds, and mammals, and the collection of specimens to be kept living or to be preserved. The laboratory work will consist of (1) A study of the structure of one type from each of the vertebrate classes. The structures will be considered as adaptations, that is, from the functional standpoint rather than from that of comparative anatomy. No attempt will be made to make this study complete in each case, but emphasis will be laid rather on the features of significance in the class. (2) A comparison of the laboratory type of each class with related forms, especially those of the local fauna, with a view to interpreting the differences as adaptations. (3) A study, where possible, of the behavior of a member of each class. The lectures will treat the subject from the biological standpoint rather than from that of comparative anatomy, and the course as a whole will seek an interpretation of the phenomena of vertebrate life seen about us.—*Four hours, first semester, five hours, second semester.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, and the influence of environment.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Assistant Professor NEWMAN:—

Physiological Zoology.

This course treats of the processes occurring in living matter,—of the general physiology of animals. The living substance is first treated as matter; the physical and chemical laws of such matter are developed in non-technical form, and the part played by these laws in the processes taking place in living matter brought out. Then the life processes are taken up in systematic order, and analyzed to determine the part played in them by these known physical and chemical factors, as well as to develop the

unknown factors,—those not known to be due to chemical and physical laws.

Emphasis will be laid throughout on an analysis into factors that are known and others that are unknown in their nature, with reference to modern vitalistic theories, and with reference to needs for further investigation.

There are regularly two lectures or recitations per week.—*Two hours, second semester.*

Heredity.

This course gives exposition and critical discussion of the results of recent investigations in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. No other course in zoology is required as a prerequisite to the election of this work, although it is recommended that it be preceded by the course in Organic Evolution. This course should be of value to students specializing in sociology, psychology, medicine and law, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Short Course in Zoology.

This course aims to present, in brief outline, by means of a text-book, the more important facts concerning the animal kingdom and to illustrate them by specimens. It thus gives a bird's-eye view of the whole subject not possible in the more special courses. It is especially designed for forestry students, but may be taken by any student who has taken the first semester work in general biology.—*Three hours, second semester.*

Dr. CASTEEL:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one or more type forms of each of the groups studied, (2) a comparison of forms related to the ones dissected, with exercises in the determination of species; (3) a study, when possible, of the instincts of one or more members of each group. This work is supplemented by occasional field excursions for the study of animals in their natural habitats, and for collecting specimens.—*Five hours, first semester.*

Mammalian Anatomy.

This course deals with the anatomy of a mammal (the cat), whose structure closely resembles that of man. It is meant for those who, for any reason, desire some knowledge of human anatomy, but who find it impossible to pursue human dissection. While it may properly form a part of a general culture course, it is of especial value to those intending to teach physiology in the secondary schools, or to carry on university work in human anatomy or physiology. Laboratory work, lectures, and quizzes.—*Four hours, second semester.*

Entomology.

A course in the habits, life histories and structure of insects. While seeking to acquaint the student with insect life and structure in general, the course is especially adapted to meet the needs of forestry students and those particularly interested in the economic phases of entomology.—*Three hours, second semester.*

Laboratory Methods and Management.

The actual work of the Zoological Department gives opportunity for a few students to become familiar with the details of carrying on a laboratory. The work of the laboratory is subdivided into a number of categories, in each of which the student is given actual practice during a certain portion of the year. Each is trained in this manner in collecting material, caring for laboratory rooms, glassware and instruments; in laboratory teaching; in the making of reagents, preparations, charts, etc., and in photography. The experience thus obtained forms the best possible practical preparation for teaching. Other things being equal, those who have had this course will be given preference in selecting the regular assistants in the department.

Only those who have had at least a year's training in zoology or general biology are eligible for this course. Application must be made beforehand, at the end of the previous year, and only those whose previous work justifies it will be accepted. As a rule not more than six students can be permitted to take this work, and they will be required to continue it throughout the year.—*Three hours, throughout the year.*

Dr. GLASER:—

Embryology of Vertebrates.

This course aims to give an introduction to the principles of embryological science as illustrated by the development of vertebrates. The lectures will be comparative; the laboratory work, largely on the organogeny of the chick, will be supplemented by demonstrations of other embryos. Considerable attention will be

given to embryological laboratory methods. This course should be preceded by Zoology 2, or some other adequate equivalent in vertebrate anatomy, histology, and physiology.—*Five hours, first semester.*

The Principles of Animal Behavior.

This course consists of lectures, readings and conferences. Its purpose is to apply the conception of evolution to the study of animal behavior and to give the student a critical appreciation of the relation of these subjects to human psychology, ethics and social science. The particular subjects to be considered are: Adaptiveness and Modifiability in Behavior; Reflex, Instinctive and Intelligent Behavior; Social Behavior; Rational and Ethical Behavior.—*Two hours, second semester.*

Dr. RUTHVEN:—

Field Ecology.

This course is intended as an introduction to the study of the relation of animals to their natural environment, as illustrated by the local fauna. Special stress is laid upon the effects of a changing or dynamic aspect of the animal environment and its influence upon the fauna, or in other words, upon the dynamic study of animal habitats and their fauna. The primary aim is not to give a mass of information, but to present a point of view and such methods of work as should aid one in studying his local fauna. This is a relatively new line of field zoology.

The lectures and conferences outline the general principles. The field trips are devoted to the study of animals and of the conditions under which they live; to methods of observation, taking notes and collecting. Special attention is given to the observable dynamic conditions. The laboratory hours are spent in the study and determination of the specimens collected, the preparation of reports and in securing a working knowledge of the literature.

No attempt will be made to cover the entire field of animal life. Attention will be given primarily to molluscs and insects among invertebrates, and to amphibians and reptiles and birds among vertebrates.

The course is intended as an introduction to the study of the local distribution of animals and its interpretation. It should be of value to those seeking a general culture course, as well as to teachers of nature study and of elementary zoology.—*Three hours, second semester.*

B. PRIMARILY FOR GRADUATES

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.

Assistant Professor NEWMAN:—

Problems in Physiological Zoology.

Dr. CASTEEL:—

Habits of the Social Hymenoptera.

Dr. GLASER:—

Problems in Embryology and Morphogenesis.

The ZOOLOGICAL FACULTY:—

C. THE BIRD CLUB

The instructors and advanced students hold meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—*One hour a week, throughout the year.*

c. The BIRD CLUB.

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

BOTANY

The work in botany in this University is divisible into morphology, physiology, and ecology. For the study of these branches there are especially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 80,000 specimens, being especially rich in algae and economic fungi. The University Botanical Garden and Arboretum now being planted, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to the preparation and the needs of the candidate. In any case the candidate receives special super-

vision and direction from the instructor. For the doctor's degree, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found elsewhere in this Announcement. (See page 9.)

A. FOR GRADUATES AND UNDERGRADUATES.

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below.

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours' laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five credit hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses: the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more credit hours a week, throughout the year.*

Teachers' Course.

Conference and reports on books, apparatus and material for high school laboratories; practical methods for collecting and preserving material and conducting field observations; preparation of outlines of courses for secondary schools.—*Two credit hours a week, first semester.*

Assistant Professor POLLOCK:—

Morphology and Classification of Fungi.

Three credit hours a week, first semester.

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three credit hours a week, second semester.*

Assistant Professor BURNS:—

Biological Relations of Plants.

Lectures, with reviews of recent literature of ecology and distribution, accompanied by field studies of habits and adaptations, and laboratory work on ecological anatomy. *Two credit hours a week, first semester.* By permission, students who are prepared to take up special problems may elect this course as *three or more hours.*

Variation under Natural and Artificial Conditions.

Plant breeding. Evolution of form and habit in adaptation to environment, including an extended study of special cases of morphological adaptation under artificial as well as natural conditions. Lectures and laboratory work.—*Two credit hours a week, first semester.*

Ecology.

A study of the habits and adaptation of plants. The floras of hills and valleys, of morainal lakes, sphagnum swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports, *two or more credit hours a week, second semester.*

Botanical Survey of the Huron Valley.

A limited number of students will be given opportunity to take part in a systematic study of the local flora.—*Two or more credit hours a week, second semester.*

The BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

Biological Problems and Theories.

This course consists of one lecture a week during the second semester on current problems and theories in biology, such as the origin of life, heredity, morphogenesis, mutation, inheritance in hybrids, mechanism and vitalism, senescence and death.

B. PRIMARILY FOR GRADUATES

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Assistant Professor POLLOCK:—

Investigations in the Morphology and Physiology of Fungi
and in Plant Pathology.

Assistant Professor BURNS:—

Investigations in Ecology and Experimental Morphology.
Problems in field and laboratory work.

Dr. KAUFFMAN:—

Investigations in the Physiology of Reproduction.

Summer Session, 1908

Graduate students of this and other approved institutions competent to enroll for a higher degree will be afforded an opportunity to do work in botany along the lines best suited to their needs. Such work, when satisfactorily completed, will be accepted as a fulfillment of the requirement for such degree. In order to secure the master's degree in summer school the student should devote one-half his time for five summers (15 hours) to graduate work in botany for a major or one-fourth this for a minor. The courses outlined below offer an opportunity for fulfilling these conditions.

FOR GRADUATES AND UNDERGRADUATES

Assistant Professor POLLOCK:—

Plant Disease.

The aim of this course is to make the student familiar with some of the more common diseases of plants which are caused by other plant agencies, Bacteria, Fungi, etc. The diseased plants will be studied with reference to the changes in structure or function produced by the disease; that is, the general pathological condition, and the organisms which cause the disease will be studied with reference to their life history and the conditions under which they develop. Methods of making culture media and obtaining pure cultures of organisms that cause disease will be studied. Field excursions will be made, to collect specimens of diseased plants and to observe them in their natural habitat. This material will be taken to the laboratory for identification. A part of the work will consist in the inoculation of healthy plants with disease-producing germs, and watching the progress of the disease. Laboratory work eight hours per week for two hours credit, and twelve hours per week for four hours credit, between 9 and 12. Besides the laboratory work, some collection and identification of material must be done for the four hours credit. This collection must be done afternoons or Saturdays. Laboratory fee, \$2.00 or \$4.00.

Assistant Professor BURNS:—

Advanced Course in Ecology.

This course will treat of the geographical distribution of plants, and of the relation of plant societies to the physiographic development of the various land forms. It is specially designed to show the result of continuous physiographic change upon plant distribution, and the consequent shifting of plant societies. The course must be preceded or accompanied by Course 2. Lectures and field work.

PRIMARYLY FOR GRADUATES

Assistant Professor POLLOCK:—

Research in Plant Pathology.

Opportunity will be afforded for competent students to undertake work along the line of special problems in plant disease.

Research in Plant Physiology.

Problems in growth, nutrition, reproduction, and sensitive reaction.

Assistant Professor BURNS:—

Research in Ecology.

Special problems will be given to advanced students. An effort will be made to take up problems which may be farther studied by the student in any locality. This course is open only to those who receive special permission from the instructor.

FORESTRY

Professor MULFORD:—

Silviculture.

This course is given as follows:

(1a) Silviculture. Introductory, including the study of soil, climate and other conditions.—*Three hours, first semester.*

(1b) Silviculture. Method of artificial and natural reproduction; seedbed and nursery work; planting and sowing in forest; reforestation of denuded lands, prairies, dunes, etc.—*Three hours, second semester.*

(1c) Silviculture. Care of forests; cleaning and thinning; protection of forests against insects and other enemies.—*Three hours, first semester.*

Courses 1a, 1b, and 1c should be taken in the order here given.

Forest Mensuration and Description.

Lectures, laboratory work, and field work.—*Three hours, throughout the year.*

Methods of measuring the volume of the individual tree and entire bodies or stands of timber; timber estimating; measurements of the rate of growth of trees and stands; methods and manner of describing a tract of forest; forest survey.

Open only to students of forestry in first year.

Dendrology.

Monographic study of forest trees; their life history; distribution, requirements, behavior and possibilities in the forest. Lectures, laboratory work and field work.—*Three hours, second semester.*

Open only to forestry students in first year.

Professor ROTH:—

Forest Utilization.

Use of timber; points of production and market; method of lumbering, milling, and marketing; minor forest industries. Lectures.—*Four hours, second semester.*

Open only to forestry students in their second year.

Forest Management.

General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved in judging the value of the forests and forest operations. Lectures and field work.—*Four hours, throughout the year.*

Open only to forestry students in their second year.

ANATOMY AND HISTOLOGY

Professors HUBER and STREETER:—

Anatomy of the Central Nervous System; a. Comparative,
b. Human.

This course consists of a detailed study of the structure of the central nervous system, and is open to students who have the requisite preliminary training.—*Three hours, first or second semester.*

Anatomy and Histology of the Special Sense Organs.

Open to students who have already taken a course in General Biology.—*Hours to be arranged with the instructor, throughout the year.*

Research.

Anatomy, Human Embryology and Histology. This work is open to students who have had the necessary preliminary training. —*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirement for a minor for the master's degree is five hours of lectures the first semester, four hours the second semester, a laboratory course of five afternoons a week for eight weeks, and a report on the literature of some limited subject. The four-hour lecture course given in the second semester should be taken before the five-hour course on the first semester. No research work will be required, except from those who have already taken advanced work in physiology. The requirement for a major for the master's degree includes, in addition to the requirement for the minor, research work during half of one semester, performed under direction.

The requirement for a minor for a doctor's degree involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a major for the doctor's degree is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Professor LOMBARD:—

Lecture Course.

Five hours a week, first semester; four hours a week, second semester.

Laboratory Course.

Fifteen hours a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY

The courses here announced presuppose that the student taking them is prepared for original research.

Professor VAUGHAN:—**Food Analysis.****Water Analysis.****Research on the Chemistry of Bacteria.**

Students doing graduate work in these subjects will be required to work in each subject for at least one year.

Professor NOVY:—**Special Methods in Bacteriology.**

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum reactions, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1907-1908.—*It is given in the first half of the second semester.*

Pathogenic Protozoa.

The work in protozoology is given in the second half of the second semester and follows Course 1, which must precede it. Special attention is given to the study of the blood parasites, such as trypanosomes, plasmodia, piroplasmes, hemogregarines, etc. The spirochetes are also taken up in this course. As far as practicable infected animals are provided for the student and an opportunity is given to do experimental work with insect hosts, as mosquitoes, ticks, etc.

Research in Bacteriology and Protozoology.**Advanced Physiological Chemistry.**

Laboratory work and reading.—*Second semester.*

HIGHER DEGREES CONFERRED IN 1907

MASTER OF ARTS

Florence Berenice Barnes, A.B.	Charles Edward Hill, A.B.
Emma Amanda Barry, A.B., <i>Albion College</i>	Flora Melinda Kempf, A.B., <i>Albion College</i>
Erma Ethel Cooper, A.B., <i>Albion College</i>	Mary Louisa Lepper, A.B., <i>Butler College</i>
Mary Jane Corbett, A.B., <i>Hillsdale College</i>	Harold Bateman McKale, A.B., <i>Albion College</i>
Maude Belle Corbett, A.B., <i>Hillsdale College</i>	Josephine Claire Mirfield, A.B., <i>Augustana College</i>
Mary Belle Cox, A.B.	Jacob Moyer, A.B., <i>Greenville College</i>
Etta Mabel Crilly, B.S., <i>Denison University</i>	Robert Washington Goldsborough Owen, A.B.
Fabian Bouton Dodds, A.B.	Carl Eugene Parry, A.B.
Helen Margaret Dudley, A.B.	Irving Day Scott, A.B., <i>Oberlin College</i>
Fred Sylvester Dunham, A.B.	Rufus Clark Shellenbarger, A.B.
Mary Berenice Gallup, A.B., <i>Wellesley College</i>	Carrie Harter Templeton, A.B.
Maude Gilchrist, B.S., <i>Iowa State Normal School</i>	Frederick William Weck, A.B., <i>University of Indiana</i>
Clara Adele Goheen, A.B.	Nellie Leila Wortman, A.B., <i>Olivet College</i>
Lawrence Hadley, B.S., <i>Earlham College</i>	
Kate Healy, Ph.B.	

MASTER OF SCIENCE

Lenore Lydia Latzer, A.B., *University of Illinois*

DOCTOR OF PHILOSOPHY

- Benjamin Franklin Bailey, B.S., (E.E.), 1898, A.M., 1900
 Physics; Electrical Engineering; Mathematics
Thesis, Induction Coils, an Experimental and Theoretical Research
- Charles William Burrows, A.B., 1898, A.M., 1901
 Physics; Mathematics; Physical Chemistry
Thesis, The Best Method of Demagnetizing Iron in Magnetic Testing
- Orma Fitch Butler, A.B., 1897, A.M., 1901, *Newberry Classical Fellow*
 Latin; Roman Law; Greek
Thesis, The Historical Worth of the Life of Antoninus Helio-
 gabalus given in the *Scriptores Historicae Augustae*
- Edwin Andrew Hayden, B.S., *University of Wisconsin*, 1894
 Sociology; Psychology; Educational Psychology
Thesis, The Social Will

Calvin Henry Kauffman, A.B., *Harvard University*, 1896

Plant Physiology; Mycology; Organic Chemistry

Thesis, Contribution to the Physiology of *Saprolegnia*

Allen Marshall Kline, A.B., 1903, A.M., 1904, *Peter White Fellow in American History*

American History; European History; Political Science

Thesis, Separation of Governmental Powers in the American Colonies

Frederick Arthur Osborn, Ph.B., 1896

Physics; Physical Chemistry; Crystallography

Thesis, Change of Index of Refraction of Liquids with Temperature

Hideo Sakuma, A.M., 1905

Finance; Political Economy; Municipal Administration

Thesis, Colonial Finance in Formosa

Donald Dexter Van Slyke, A.B., 1905

Organic Chemistry; Plant Physiology; Bacteriology

Thesis, Action of Molecular Silver, Silver Sulphate, and Silver Chloride upon some halogenated Triphenyl-carbinol-chlorides

HOLDERS OF FELLOWSHIPS, 1907-1908

Elmer Cleveland Adams,¹ *George S. Morris Scholar in Philosophy*

Ellen Botsford Bach, A.M., *Angeline Bradford Whittier Fellow in Botany*

John Serenus Bordner, A.B., *Dexter M. Ferry Fellow in Botany*

Neil Thompson Chamberlin,² B.S., *Stearns Fellow in Pharmaceutical Chemistry*

Ray Eli Cleveland, A.B., *Buhl Classical Fellow*

Albert Robinson Crittenden, A.M., *Peter White Classical Fellow*

Alvin Eleazer Evans, A.M., *Buhl Classical Fellow*

Dean Ely Godwin,³ *Rockefeller Fellow in Hygiene and Bacteriology*

Clyde L. King, A.B., *Peter White Fellow in American History*

Ludwig Thorsten Larsen, A.M., *Newberry Classical Fellow*

George Byron Roth,⁴ A.B., *Parke, Davis and Company Fellow in Chemistry*

Frank Van Vliet, A.B., *George S. Morris Fellow in Philosophy*

John Harvey Wyman,⁴ B.S., *Gas Engineering Fellow*

¹ Undergraduate in the Department of Literature, Science, and the Arts.

² Registered in the Department of Pharmacy.

³ Registered in the Department of Medicine.

⁴ Registered in the Department of Engineering.

STUDENTS IN THE GRADUATE SCHOOL 1907-1908

- *John Quincy Adams, B.L., 1894, LL.B.,
1898 *Alma*
English Oratory; English Drama; English History
- James Howard Agnew, A.B., 1907 *Allegheny, Pa.*
Physiological Chemistry; Hygiene; Bacteriology
- †Herbert Francis Allen, A.B., *University*
of S. Dakota, 1905, A.M., *ibid.*, 1906 *Ann Arbor*
English Literature; Rhetoric; German Literature
- Henry Wesley Allinger, A.B., *University*
of Missouri, 1903 *Bushton, Kan.*
German Literature; Germanic Philology; English Literature
- *Mary Emma Armstrong, A.B., *Olivet Col-*
lege, 1894, A.M., 1898 *Lapeer*
Latin; Greek; Ancient Philosophy
- Walter Arthur, A.B., *University of Mis-*
souri, 1907 *Reeds, Mo.*
Analytical Chemistry; General Chemistry; Mineralogy
- *Margaretha Marie Ascher, A.B., 1899 *Saginaw*
Germanic Philology; German Literature; French
- *Cornelius K. Baarman, A.B., 1904 *Zeeland*
Plan B (Physics)
- Ellen Botsford Bach, A.B., 1901, A.M.,
1903, *Angeline Bradford Whittier*
Fellow in Botany *Ann Arbor*
Botany; Plant Physiology; Vertebrate Zoology
- Francis Miller Bacon, A.B., 1902 *St. Clair*
American History; Government; Political Economy
- †Etta Mae Barkdull, B.L., *Ohio Wesleyan*
University, 1892 *Toledo*
Plan B (English Literature; Rhetoric)
- Floyd E. Bartell, A.B., *Albion College*,
1905 *Concord*
Physical Chemistry; Analytical Chemistry; Mineralogy
- John Knight Munro Berry, A.B., 1901,
A.M., 1902 *Detroit*
German Literature; Germanic Philology; Latin
- William Shepard Biddle, *Graduate of*
U. S. Military Academy, 1885 *Portland, Ore.*
- *Martha Tarsney Blatz, A.B., 1905 *West Saginaw*
Plan B (English Literature; Rhetoric)
- †John Serenus Bordner, A.B., *University*
of Indiana, 1904, *Dexter M. Ferry*
Fellow in Botany *Bristol, Ind.*
Botany; Forestry; Analytical Chemistry

¹ The subjects of study pursued by candidates for an advanced degree are indicated under their respective names, the subject first named being the major study. If a candidate for a master's degree is pursuing his work under Plan B (see p. 9), his subjects of study are given in parentheses. An asterisk (*) preceding a student's name indicates that he was enrolled in the Summer Session of 1907 only. A dagger (†) preceding a student's name indicates that he was enrolled in both the Summer Session of 1907 and in the regular academic session of 1907-1908.

- Lawrence Ray Boyer, A.B., 1906 *Niles*
 Physics; Mathematics; Astronomy
- Harold Prell Breitenbach, A.B., 1901, *Ann Arbor*
 A.M., 1903
 Rhetoric; English Literature; Aesthetics
- *James Irven Bricker, A.B., *Hillsdale*
College, 1894 *West Saginaw*
 Botany; Plant Ecology; Zoology
- *Beulah Evangeline Brigham, A.B., 1906 *Grand Rapids*
 Plan B (German; French)
- Glen B. Britton, A.B., 1907 *Oxford, O.*
 General Chemistry; Physical Chemistry; Mineralogy
- *Cornelius James Brosnan, A.B., 1905 *Ovid*
 American History; English Literature; Education
- Asa Lee Brower, B.S., *Morningside Col-*
lege, 1906, *Sioux City, Ia.*
 Forest Management; Silviculture; Forest Mensuration
- *Grace Enos Brown, A.B., 1904 *Aurora, Ill.*
 English Literature; German; Latin
- John R. Brumm, A.B., 1904, A.M., 1906 *Ann Arbor*
 Rhetoric; English Literature; Aesthetics
- Warren David Brush, B.S., *Baldwin*
University, 1905, A.M., 1906 *Berea, O.*
 Botany; Plant Ecology; Zoology
- Robert John Carney, A.B., 1907 *Sturgis*
 Analytical Chemistry; Organic Chemistry; Physics
- *Jesse Bryant Carpenter, A.B., 1902 *Louisville, Ky.*
 Latin; Greek; German
- *Laura Augusta Carpenter, A.B., 1897 *Muskegon*
 Plan B (English)
- *Gail Luke Carver, A.B., 1907 *Climax*
 Zoology; Mineralogy; Physics
- *Earl William Castle, A.B., 1907 *Ann Arbor*
 Astronomy; Mathematics; Insurance
- *William Dean Chadwick, A.B., *Marietta*
College, 1905 *Albion*
 Plan B (English Literature; Rhetoric)
- *Clara Abigail Chase, A.B., 1902 *Manistee*
 Plan B (English Literature; Rhetoric; Education)
- Chen Wei Cheng, A.B., *Peking University*
(Peking, China), 1896, A.M., *ibid.*,
 1907 *Peking, China*
 European History; International Law; Political Economy
- Ray Eli Cleveland, A.B., *Iowa State Uni-*
versity, 1906, *Buhl Classical Fellow* *Cedar Falls, Ia.*
 Latin; Greek; Ancient Philosophy
- John Lewis Cobbs, Jr., A.B., *University*
of the South, 1907 *Montgomery, Ala.*
 Forest Management; Silviculture; Forest Mensuration
- Isaac Merton Cochran, A.B., 1907 *Angola, Ind.*
 Plan B (English Literature; Rhetoric; Elocution)
- Walter Francis Colby, A.B., 1901 *Ann Arbor*
 Physics; Mathematics; Music

- Arthur Charles Cole, A.B., 1907 *Ann Arbor*
American History; English History; Constitutional Law
- Harry Newton Cole, A.B., 1901, B.S. *Ann Arbor*
(Ch.E.), 1906
Metallurgy; Physics; Chemical Technology
- Irwin Wycliffe Cook, B.S., *Washburn College*, 1907 *Oberlin, Kan.*
Forest Management; Silviculture; Forest Mensuration
- Leigh Guillot Cooper, A.B., 1907 *Detroit*
American History; Economics
- Clarence Clifford Corl, A.B., 1903 *Toledo, O.*
Plan B (English Literature; American History)
- *Anna Belle Corson, A.B., 1903 *Birmingham*
Plan B (English Literature; German)
- †Albert R. Crittenden, A.B., 1894, A.M., *Olivet*
1902, *Peter White Classical Fellow*
Latin; Philosophy; Education
- Maynie Rose Curtis, A.B., 1905 *Mason*
Zoology; Plant Physiology; Plant Pathology
- *Editha Lewis Dann, A.B., 1907 *Columbus, O.*
Plan B (Aesthetics; Education; German)
- †Calvin Olin Davis, A.B., 1895, A.M., 1904 *Ann Arbor*
History of Education; Theory of Education; History of Modern Philosophy
- John William DeBruyn, A.B., 1907 *Holland*
Sociology; Psychology; European History
- George Bion Denton, A.B., 1907 *Detroit*
European History; Rhetoric; History of Philosophy
- Ralph Devries, B.S. (E.E.), 1907 *Holland*
Physics; Mathematics; Electrical Engineering
- James Robert Dickson, A.B., 1907 *Searforth, Ont.*
Forest Management; Silviculture; Dendrology
- Richard d'Zeeuw, A.B., 1907 *Sioux Center, Ia.*
Botany; Plant Pathology; Zoology
- †Frank William Douglas, A.B., *Albion College*, 1905 *Albion*
Metallurgy; Physics; Hygiene
- Alvin Eleazer Evans, A.B., *Cotner University*, 1896, A.M., *University of Nebraska*, 1898, *Buhl Classical Fellow* *Bethany, Neb.*
Latin; Roman Law; Greek
- *John Phelps Everett, A.B., 1901 *Mt. Clemens*
History of Education; History of Philosophy; Psychology
- Frederick Montague Foster, A.B., *University of California*, 1902, A.M., *ibid.*, 1903 *Olivet*
Greek; Latin; Ancient Philosophy
- Leo Morris Franklin, B.L., *University of Cincinnati*, 1892 *Detroit*
Sociology; Philosophy of Religion; Ethics

- James Edwin Fulcher, C.E., *Missouri School of Mines and Metallurgy*, 1886
Physics; Astronomy; Geology
Ann Arbor
- Esson McDowell Gale, A.B., 1907
European History; English History; English Literature
Bay City
- *Edward Everett Gallup, A.B., 1906
History of Education; Psychology; Sociology
Chelsea
- William Van Nest Garretson, B.S., *Rutgers College*, 1902, M.S., *Yale University*, 1904
Pure Mathematics; Theoretical Applied Mathematics; Astronomy
Somerville, N. J.
- Henry Mills Gelston, A.B., 1900
Latin; Greek; Ancient Philosophy
Ann Arbor
- Olive May Gilbreath, A.B., *Wellesley College*, 1906
Plan B (English Literature; Rhetoric; Philosophy)
La Plata, Mo.
- *Henry Newell Goddard, Ph.B., 1893
Plan B (Botany)
Waukesha, Wis.
- *Clara Adele Goheen, A.B., 1905
American Literature; Rhetoric; Sociology
Buckhannon, W. Va.
- *Edna Grant, A.B., *Oberlin College*, 1904, A.M., 1906
Oberlin, O.
- Otilie Kunigunde Grauer, A.B., 1907
German; French; Theory of Education
West Saginaw
- †Alexander Charles Gray, A.B., *University of Toronto*, 1896, A.M., *Hiram College*, 1897
American History; Sociology; Ethics
Ann Arbor
- *Clarence Wilson Greene, A.B., 1903, A.M., 1905
Physics; Mathematics; Electrical Engineering
Albion
- George Andrew Gutches, B.S., *Hobart College*, 1906
Forest Management; Silviculture; Forest Mensuration
Coldwater
- *Laurence Hadley, B.S., *Earlham College*, 1902
Mathematics; Astronomy; Physics
Danville, Ind.
- *Minnie Olivia Hall, A.B., 1904
American Literature; English Drama; Rhetoric
Anaconda, Mont.
- Harry Emmons Hammond, A.B., 1905
Physics; Mathematics; Astronomy
Ann Arbor
- Herbert Aaron Hard, B.S., *Ohio Wesleyan University*, 1897
Physical Chemistry; Quantitative Chemistry; Physiography
Columbus, O.
- Grace Angeline Harrington, A.B., *Oberlin College*, 1898
Latin; Greek; Ancient Philosophy
Akron, O.
- *Kate Healy, Ph.B., 1899
Latin; English Literature; Greek Mythology
Fort Dodge, Ia.
- Homer Leslie Heath, A.B., 1907
Ann Arbor

- John Roy Hoats, A.B., *Iowa State Normal School*, 1906 *Moore Park*
- *Alma May Elizabeth Hinkle, A.B., 1906 *Philadelphia, Pa.*
Plan B (English Literature; German)
- Louis Allen Hopkins, A.B., *Butler College*, 1905, M.S., *University of Chicago*, 1906 *Ann Arbor*
Pure Mathematics; Theoretical Applied Mathematics; Astronomy
- *Henry Huizinga, A.B., *Hope College*, 1893, A.M., *ibid.*, 1896 *Ongole, India*
Theory of Education; English Literature; Sanscrit
- Walter Fred Hunt, A.B., 1904, A.M., 1905 *Ann Arbor*
Mineralogy; Analytical Chemistry; Dynamical Geology
- Fred Walter Hunter, B.S., *University of Rochester*, 1907 *Rochester, N. Y.*
Organic Chemistry; Physical Chemistry; Food Analysis
- *Frank C. Janes, B.S., *Albion College*, 1898 *Williamston*
Plan B (Education)
- Myra Anna Jaquet, A.B., 1907 *Ann Arbor*
Latin; Greek; Roman Political Institutions
- Hildegard Jend, B.L., *German Wallace College*, 1907 *Pittsburg, Pa.*
German Literature; Germanic Philology; Education
- Gertrude Marie Johnston, Ph.B., *University of Vermont*, 1906 *Ann Arbor*
German; French; English Literature
- *Myron Delos Jerome, A.B., 1906 *Evart*
- Paul Van Brunt Jones, A.B., 1906 *Ann Arbor*
European History; English History; English Literature
- Herbert Alden Kenyon, A.B., *Brown University*, 1904, A.M., *ibid.*, 1905 *Ann Arbor*
Romance Literature; Romance Philology; English Literature
- Peter Keplinger, Ph.B., *Colorado College*, 1904 *Colorado Springs, Col.*
Forest Management; Silviculture; Forest Mensuration
- Clyde L. King, A.B., 1907, *Peter White Fellow in American History* *Emporia, Kan.*
American History; Public Law; Government
- *Edith Wilmer Kinnan, A.B., 1904 *Saginaw*
History and Philosophy of Education; Psychology; Physics
- *Marjorie Kinnan, A.B., 1904 *Saginaw*
History and Philosophy of Education; Psychology; Physics
- *William Gifford Kirby, A.B., 1906 *Galesburg*
Physics; Chemistry; Mathematics
- Richard Ray Kirk, A.B., 1903, A.M., 1904 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Arthur Charles Klocksien, A.B., *German Wallace College*, 1898, A.M., *ibid.*, 1899 *Cleveland, O.*
German Literature; Germanic Philology; English Literature

-
- *Carrie Krell *Chelsea*
Plan B (English Literature; German)
- *Erna Kruckemeyer, A.B., *University of Cincinnati*, 1903 *Cincinnati, O.*
Plan B (Latin)
- †Lucas Petrou Kyriakides, A.B., 1907 *Broussa, Turkey*
Organic Chemistry; Physical Chemistry; Physics
- Jessie Cogswell Laird, A.B., *Mt. Holyoke College*, 1906 *Ypsilanti*
Plan B (German; French)
- *Helen Rose Lang, B.L., 1900 *Indianapolis, Ind.*
Plan B (English Literature; Aesthetics)
- Ludwig Thorsten Larsen, A.B., *Olivet College*, 1899, A.M., *ibid.*, 1902, *Newberry Classical Fellow* *Ann Arbor*
Greek; Greek Archaeology; Ancient Philosophy
- Adelbert Llewellyn Leathers, Ph.B., *Wesleyan University*, 1907 *So. Orrington, Me.*
Zoology; Botany
- *George Allan Lindsay, A.B., 1905 *Detroit*
Physics; Mathematics; Astronomy
- Clyde Elton Love, A.B., 1905 *Ann Arbor*
Mathematics; Structural Mechanics; Strength and Resistance of Materials
- *Lester Angus McDiarmid, B.S., 1900 *Albion*
Mathematics; Astronomy; History of Education
- *Florence Margaret McHugh, Ph.B., 1900 *Omaha, Neb.*
Plan B (German; Aesthetics)
- Alice Malone, A.B., 1907 *Detroit*
German; French Literature; French Philology
- Otto Charles Marckwardt, A.B., 1901, A.M., 1902 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Burl Garfield Martin, A.B., 1907 *Angola, Ind.*
Plan B (English Literature; Rhetoric; Oratory)
- †Frank John Mellencamp, A.B., 1903, A.M., 1906 *Ann Arbor*
Physics; Physical Chemistry; Mathematics
- Frederick Jacob Menger, Jr., A.M., *Western Reserve University*, 1902 *Wayne, Wis.*
German Literature; Germanic Philology; English Literature
- *Emerson Romeo Miller, B.S., 1894, M.S., 1905 *Auburn, Ala.*
Organic Chemistry; Pharmacognosy; Plant Physiology
- Helen Dorothea Miller, Ph.B., *University of Chicago*, 1907 *Chicago, Ill.*
- Albert Taylor Mills, Ph.B., 1899 *Decatur, Ill.*
American History; Public Law; Roman Political Institutions
- William Daniel Moriarty, A.B., 1904, A.M., 1905 *Ann Arbor*
Rhetoric; English Literature; Aesthetics
- Chester Birney Morse, A.B., *Ripon College*, 1905 *St. Anthony, Idaho*
Forest Management; Silviculture; Forest Mensuration

- *Jacob Moyer, A.B., *Greenville College*,
1901, A.M., 1907 *Greenville, Ill.*
- *Margaret Parthenia Murrell, A.B., 1902 *Decatur, Ill.*
English Literature; Aesthetics; Latin
- *Effie May Niles, A.B., 1904 *Ann Arbor*
Plan B (English Literature; Rhetoric)
- *Clyde S. Paxton, A.B., 1906 *Marshall*
Plan B (Physics; Mathematics)
- Leigh H. Pennington, A.B., 1907 *Ann Arbor*
Plant Physiology; Mycology; Organic Chemistry
- Charles Milton Perry, A.B., *Albion Col-
lege*, 1900 *Coldwater*
Philosophy; American History; Economics
- Roy Gifford Pierce, A.B., *University of
Nebraska*, 1907 *Lincoln, Neb.*
Forest Management; Silviculture; Forest Mensuration
- Francis John Pipal, A.B., *University of
Nebraska*, 1907 *Omaha, Neb.*
Forest Management; Silviculture; Forest Mensuration
- Eugene Lyman Porter, A.B., *Harvard Uni-
versity*, 1904 *Adrian*
Zoology; Physiology; Physiological Chemistry
- Frank Fraser Potter, A.B., 1902, A.M.,
1903 *Ann Arbor*
Latin; Greek; Ancient Philosophy
- Franklin Uriah Quillin, A.B., *Ohio Wes-
leyan University*, 1903, A.M., *Har-
vard University*, 1905 *Ypsilanti*
American History; Sociology; Economics
- William Ober Raymond, A.B., *University
of New Brunswick*, 1902 *Ann Arbor*
Philosophy of Religion; Metaphysics; Hebrew
- Dexter Belden Reynolds, A.B., *Park Col-
lege*, 1906 *Helena, Mont.*
Forest Management; Silviculture; Forest Mensuration
- Daniel Leslie Rich, A.B., *Waynesburg Col-
lege*, 1902 *Ann Arbor*
Physics; Mathematics; Physical Chemistry
- *Elmer Roy Rike, A.B., *Ohio Wesleyan
University*, 1905 *Piqua, O.*
- *Walter Delmer Riggs, A.B., 1907 *Lake Linden*
History of Education; Theory of Education; Psychology
- †Charles Summers Robinson, A.B., 1907 *Chicago, Ill.*
Organic Chemistry; Physical Chemistry; Physics
- †Gertrude Louise Roper, A.B., 1904 *Detroit*
Physics; Mathematics; Astronomy
- Irving Day Scott, A.B., *Oberlin College*,
1900, A.M., 1907 *Ann Arbor*
Geology; Mineralogy; Physiography
- Roy Wood Sellars, A.B., 1903 *Ann Arbor*
Metaphysics; History of Philosophy; Sociology

- Eugene Howard Seymour, A. B., *Park College*, 1906
Forest Management; Silviculture; Forest Mensuration
Lyons Falls, N. Y.
- Esther Elizabeth Shaw, A.B., *Mt. Holyoke College*, 1907
Rhetoric; English Literature; Philosophy
Fall River, Mass.
- Charles Everett Skinner, B.L., 1896
Rhetoric; English Literature; Aesthetics
Ann Arbor
- *Rufus Clark Shellenbarger, A.B., 1903
Physics; Mathematics; Education
Yankton, S. Dak.
- William Gabb Smeaton, A.B., *University of Toronto*, 1898
Physical Chemistry; Mineralogy; Metallurgy
Ann Arbor
- Lisle D. Smith, A.B., *Albion College*, 1905
Physics; Organic Chemistry; Mathematics
Lansing
- *Robert C. Smith, A.B., 1905
Plan B (English Literature; Education)
St. Johns
- *Robert Earle Snyder, A.B., 1905
Physics; Mathematics; Astronomy
Marquette
- Arthur William Stalker, A.B., 1884
Aesthetics; Ethics; English Literature
Ann Arbor
- John Wallace Stephen, A.B., 1907
Forest Management; Silviculture; Forest Mensuration
Ann Arbor
- Manson Alexander Stewart, A.B., 1903,
A. M., 1904
Latin; Greek; Ancient Philosophy
Elba
- Sidney Smith Stewart, A.B., *Wabash College*, 1906
Silviculture; Forest Mensuration; Mechanical Engineering
Avilla, Ind.
- *Harry Bryan Stover, A.B., 1906
French Literature; French Philology; German Literature
Valley Falls, N. Y.
- *Hildegarde Strempfer, A.B., 1905
Plan B (German; Rhetoric)
Toledo, O.
- *James Wellings Sturgis, A.B., 1896, A.M., 1897
Latin; Greek; Ancient Philosophy
Norman, Okla.
- *Alice Kerr Sturm, A.B., 1902
Latin; Roman Political Institutions; English Literature
Beaver, Pa.
- John Edward Tanis, A.B., *Kalamazoo College*, 1904
Organic Chemistry; Chemical Technology; Physics
Kalamazoo
- Margaret Lloyd Tatlock, A.B., 1905
Aesthetics; Metaphysics; Rhetoric
Ann Arbor
- Joseph Luther Thalman, A.B., *Ohio Wesleyan University*, 1900
Botany; Plant Ecology; German Literature
Owosso
- Harry Conrad Thurnau, A.B., 1899, A.M., 1903
German Literature; Germanic Philology; English Literature
Ann Arbor
- Luella Townley, A.B., 1904
Rhetoric; English Literature; European History
Cincinnati, O.
- Margaret Grace Townley, A.B., 1906
American History; English History; English Literature
Ann Arbor

- †Ora Travis, A.B., 1904, A.M., 1905. *Ann Arbor*
 Latin; Greek; Roman Law
- Charles Alexander Vallance, A.B., 1907 *Fowlerville, N. Y.*
 Organic Chemistry; Analytical Chemistry; Mineralogy
- *Albert Edward Van Landegend, A.B.,
 1907 *Holland*
 Plan B (History)
- Frank Van Vliet, A.B., 1902, *George S. Morris Fellow in Philosophy* *Ann Arbor*
 History of Philosophy; Metaphysics; Mathematics
- Charles Bruce Vibbert, A.B., 1904 *Detroit*
 Logic; Psychology; History of Philosophy
- *Theodore Edward Wagner, A.B., 1905 *Detroit*
 Physics; Physical Chemistry; Astronomy
- *Dwight Everett Watkins, A.B., 1901 *Akron, O.*
 Elocution; English Literature; English Drama
- Frederick William Weck, A.B., *University of Indiana*, 1905, A.M., 1907 *Ann Arbor*
 German Literature; Germanic Philology; English Literature
- Francis William Wetmore, B.S., *Knox College*, 1900 *Galesburg, Ill.*
 Forest Management; Silviculture; Spanish
- Levi Philip Ray Willoughby, A.B., 1900 *Detroit*
 Geology; Mineralogy; Botany
- *John E. Winter, A.B., 1906 *Holland*
 Psychology; Philosophy; Education
- John Zedler, A.B., *Albion College*, 1903 *Albion*
 German Literature; Germanic Philology; English Literature
- Karl Wilhelm Zimmerschied, A.B., 1903, M.S., 1904 *Ann Arbor*
 Metallurgy; Analytical Chemistry; Commerce

The following students, enrolled in the Graduate School, were permitted to complete a portion of their studies *in absentia*:

- John Quincy Adams, B.L., 1894 *Alma*
 English Oratory; English History; English Drama
- Julius Frank Kimmel, A.B., 1906 *Washington, D. C.*
 Forest Management; Silviculture; Forest Mensuration
- Edith Wilmer Kinnan, A.B., 1904 *Saginaw*
 History and Philosophy of Education; Psychology; Physics
- Marjorie Kinnan, A.B., 1904 *Saginaw*
 History and Philosophy of Education; Psychology; Physics
- Charles Stowell Smith, A.B., 1905 *New Haven, Conn.*
 Forest Management; Silviculture; Ecology
- Dwight Everett Watkins, A.B., 1901 *Akron, O.*
 Elocution; English Literature; English Drama

The following students, enrolled in the Department of Medicine, were also candidates for an advanced degree in the Department of Literature, Science, and the Arts:

William J. Marshall, A.B., 1905	<i>Ann Arbor</i>
Hygiene; Quantitative Chemistry; Organic Chemistry	
Ralph Reynolds Pinckard, A.B., 1906	<i>St. Johns</i>
Anatomy (major and both minors)	

The following students, having completed their undergraduate course at the University at the close of the first semester, 1908, were allowed registration in the Graduate School:

May Louise Baker	<i>Bay City</i>
American History; Economics; Rhetoric	
Lucile Henrietta Carter	<i>Decatur, Ill.</i>
Plan B (German; American History)	
Henry Ward Church	<i>St. Joseph</i>
German Literature; Germanic Philology; French	
Fern Inez Fleming	<i>Detroit</i>
Plan B (English Literature; Rhetoric)	
Herbert Graff	<i>Ionia</i>
Forest Management; Silviculture; Forest Mensuration	
Martin Weston Kramer	<i>Elk Rapids</i>
Helen Mary Martin	<i>Lapeer</i>
Geology; Organic Chemistry; General and Physical Chemistry	
Herma Louise Meyer	<i>Lincoln, Ill.</i>
German; French; Theory of Education	
Henrietta Elizabeth Rosenthal	<i>Ann Arbor</i>
Latin; Greek; German	
Sadie Agnes Stiles	<i>Grand Rapids</i>
English Literature; Rhetoric; French	

SUMMARY

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UNIVERSITY OF MICHIGAN

DEPARTMENT OF
LITERATURE, SCIENCE, AND THE ARTS

GRADUATE SCHOOL

Annual Announcement

FOR

1909-1910

AND SUMMER SESSION OF 1909

Wm. Herbert

PUBLISHED BY THE UNIVERSITY

1909

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EDWARD DEMILIE CAMPBELL, B.S., *Professor of Chemical Engineering and Analytical Chemistry and Director of the Chemical Laboratory.*

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ISAAC NEWTON DEMMON, A.M., LL.D., *Professor of English.*

MARTIN LUTHER D'OOGHE, PH.D., LL.D., D.LITT., *Professor of the Greek Language and Literature.*

RICHARD HUDSON, A.M., LL.D., *Professor of History.*

JOSEPH LYBRAND MARKLEY, PH.D., *Professor of Mathematics.*

JOHN OREN REED, PH.D., *Professor of Physics, and Dean of the Department of Literature, Science, and the Arts.*

ROBERT MARK WENLEY, Sc.D., LL.D., D.PHIL., *Professor of Philosophy.*

ALLEN SISSON WHITNEY, A.B., *Professor of Education.*

CALENDAR

1909.

- | | |
|---------|-------------------------------------------------------------|
| June 24 | Commencement. |
| June 28 | Summer Session begins. |
| Aug. 20 | End of Summer Session. |
| Oct. 5 | First Semester begins in all Departments of the University. |
| Nov. 25 | Thanksgiving Day. Holiday. |
| Dec. 22 | (Evening) Christmas Vacation begins in all Departments. |

1910.

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| Jan. 5 | Exercises resumed. |
| Feb. 11 | End of First Semester. |
| Feb. 14 | Second Semester begins. |
| April 8 | (Evening) Recess begins, ending April 18 (evening). |
| May 30 | Memorial Day. Holiday. |
| June 30 | Commencement. |
| July 5 | Summer Session begins. |
| Aug. 26 | End of Summer Session. |

FACULTY

- JAMES BURRILL ANGELL, LL.D., PRESIDENT.
South University Avenue.
- MARTIN LUTHER D'OOGHE, LL.D., D.LITT., *Professor of
the Greek Language and Literature.*
1523 Washtenaw Avenue.
- ISAAC NEWTON DEMMON, A.M., LL.D., *Professor of Eng-
lish.*
1432 Washtenaw Avenue.
- WOOSTER WOODRUFF BEMAN, A.M., LL.D., *Professor of
Mathematics.*
813 East Kingsley Street.
- VICTOR CLARENCE VAUGHAN, PH.D., M.D., LL.D., *Pro-
fessor of Hygiene and Physiological Chemistry, Director of
the Hygienic Laboratory, and Dean of the Department of
Medicine and Surgery.*
221 South State Street.
- HENRY SMITH CARHART, A.M., LL.D., *Professor of Physics
and Director of the Physical Laboratory.*
521 Monroe Street.
- HENRY CARTER ADAMS, PH.D., LL.D., *Professor of Po-
litical Economy and Finance.*
1421 Hill Street.
- RICHARD HUDSON, A.M., LL.D., *Professor of History.*
1023 Oakland Avenue.
- ALBERT AUGUSTUS STANLEY, A.M., *Professor of Music.*
1722 Israel Avenue.
- FRANCIS WILLEY KELSEY, PH.D., *Professor of the Latin
Language and Literature.*
826 Tappan Street.
- OTIS COE JOHNSON, PH.C., A.M., *Professor of Qualitative
Analysis.*
730 South Thayer Street.
- WARREN PLIMPTON LOMBARD, A.B., M.D., *Professor of
Physiology.*
805 Oxford Road.
- JACOB REIGHARD, PH.B., *Professor of Zoology and Director
of the Zoological Laboratory and the Zoological Museum.*
1502 Israel Avenue.
- THOMAS CLARKSON TRUEBLOOD, A.M., *Professor of
Oratory.*
1024 Hill Street.
- JAMES ALEXANDER CRAIG, B.D., PH.D., *Professor of Sem-
itic Languages and Literature and Hellenistic Greek.*
1502 Hill Street.

- ROBERT MARK WENLEY, Sc.D., LL.D., D.Phil., *Professor of Philosophy.* 509 East Madison Street.
- ARTHUR GRAVES CANFIELD, A.M., *Professor of Romance Languages.* 909 East University Avenue.
- FRED NEWTON SCOTT, Ph.D., *Professor of Rhetoric.* 539 East University Avenue.
- MAX WINKLER, Ph.D., *Professor of the German Language and Literature.* 920 Oakland Avenue.
- FREDERICK GEORGE NOVY, Sc.D., M.D., *Professor of Bacteriology.* 721 Forest Avenue.
- EDWARD DEMILLE CAMPBELL, B.S., *Professor of Chemical Engineering and Analytical Chemistry and Director of the Chemical Laboratory.* 1555 Washtenaw Avenue.
- ALLEN SISSON WHITNEY, A.B., *Professor of Education.* 18 Cutting Apartments.
- FILIBERT ROTH, B.S., *Professor of Forestry.* 730 South State Street.
- G. CARL HUBER, M.D., *Professor of Histology and Embryology, Director of the Histological Laboratory, and Secretary of the Faculty of the Department of Medicine and Surgery.* 1330 Hill Street.
- FRED MANVILLE TAYLOR, Ph.D., *Professor of Political Economy and Finance.* 527 Church Street.
- ALEXANDER ZIWET, C.E., *Professor of Mathematics.* 644 South Ingalls Street.
- MOSES GOMBERG, Sc.D., *Professor of Organic Chemistry.* 725 Oxford Road.
- GEORGE WASHINGTON PATTERSON, Ph.D., *Professor of Electrical Engineering.* 814 South University Avenue.
- FREDERICK CHARLES NEWCOMBE, Ph.D., *Professor of Botany, in Charge of the Botanical Laboratory.* 1817 Geddes Avenue.
- JOHN OREN REED, Ph.D., *Professor of Physics, and Dean of the Department of Literature, Science, and the Arts.* 907 Lincoln Avenue.
- THEODORE WESLEY KOCH, A.M., *Librarian.* 820 Church Street.
- WILLIAM JOSEPH HUSSEY, B.S., *Professor of Astronomy and Director of the Observatory.* Observatory.
- CLAUDE HALSTEAD VAN TYNE, Ph.D., *Professor of American History.* New Jersey Avenue.

- JOSEPH HORACE DRAKE, PH.D., LL.B., *Professor of Latin, Roman Law, and Jurisprudence.* 903 Lincoln Avenue.
- ALBERT MOORE BARRETT, A.B., M.D., *Professor of Psychiatry and Diseases of the Nervous System in the Department of Medicine and Surgery.* 1014 Cornwell Place.
- WILLIAM HERBERT HOBBS, PH.D., *Professor of Geology and Director of the Geological Laboratory and Museum.* 504 South State Street.
- ALFRED HENRY LLOYD, PH.D., *Professor of Philosophy.* 1735 Washtenaw Avenue.
- MORITZ LEVI, A.B., *Professor of French.* 928 Olivia Avenue.
- JOSEPH LYBRAND MARKLEY, PH.D., *Professor of Mathematics.* Geddes Avenue and Oxford Road.
- CHARLES HORTON COOLEY, PH.D., *Professor of Sociology.* 703 Forest Avenue.
- S. LAWRENCE BIGELOW, PH.D., *Professor of General and Physical Chemistry.* 1520 Hill Street.
- GEORGE LINIUS STREETER, A.M., M.D., *Professor of Anatomy in the Department of Medicine and Surgery.* 620 South State Street.
- JULIUS OTTO SCHLOTTERBECK, PH.D., PH.C., *Professor of Pharmacognosy and Botany and Dean of the School of Pharmacy.* 1319 Israel Avenue.
- ARTHUR GRAHAM HALL, PH.D., *Professor of Mathematics, Registrar of the Department of Literature, Science, and the Arts, and University Editor.* 1036 Oakland Avenue.
- EDWARD HENRY KRAUS, PH.D., *Professor of Mineralogy and Petrography, Director of the Mineralogical Laboratory, and Secretary of the Summer Session.* 818 Oakland Avenue.
- ST. GEORGE L. SIOUSSAT, PH.D., *Professor of History in the University of the South, Summer Session of 1909.* Sewanee, Tenn.
- WALTER DENNISON, PH.D., *Junior Professor of Latin.* 943 Greenwood Avenue.
- EARLE WILBUR DOW, A.B., *Junior Professor of History.* 554 Thompson Street.
- GEORGE REBEC, PH.D., *Junior Professor of Philosophy.* Hickory Grove, New Jersey Avenue.
- EDWARD DAVID JONES, PH.D., *Junior Professor of Commerce and Industry.* 625 Oxford Road.

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- WALTER BOWERS PILLSBURY, PH.D., *Junior Professor of Philosophy and Director of the Psychological Laboratory.*
714 South State Street.
- ALVISO BURDETT STEVENS, PH.C., PH.D., *Junior Professor of Pharmacy, and Secretary of the School of Pharmacy.*
730 South Thayer Street.
- JOHN ARCHIBALD FAIRLIE, PH.D., *Junior Professor of Administrative Law.*
730 South Thayer Street.
- JOHN ROBERT EFFINGER, PH.D., *Junior Professor of French, and Dean of the Summer Session.*
• 745 East University Avenue.
- TOBIAS DIEKHOFF, PH.D., *Junior Professor of German.*
1030 Oakland Avenue.
- LOUIS A. STRAUSS, PH.D., *Junior Professor of English.*
900 Lincoln Avenue.
- JAMES WATERMAN GLOVER, PH.D., *Junior Professor of Mathematics and Insurance.*
620 Oxford Road.
- CAMPBELL BONNER, PH.D., *Junior Professor of Greek.*
1511 Washtenaw Avenue.
- ALFRED HOLMES WHITE, A.B., B.S., *Junior Professor of Chemical Engineering.*
933 Forest Avenue.
- ARTHUR LYON CROSS, PH.D., *Junior Professor of History.*
705 South State Street.
- JOHN STRONG PERRY TATLOCK, PH.D., *Junior Professor of English.*
730 South Thayer Street.
- FREDERIC LOGAN PAXSON, PH.D., *Junior Professor of American History.*
715 Church Street.
- WALTER MULFORD, B.S.A., F.E., *Junior Professor of Forestry.*
1008 Michigan Avenue.
- HENRY ARTHUR SANDERS, PH.D., *Junior Professor of Latin.*
1227 Washtenaw Avenue.
- JONATHAN AUGUSTUS CHARLES HILDNER, PH.D., *Junior Professor of German.*
1026 Greenwood Avenue.
- CLARENCE LINTON MEADER, PH.D., *Assistant Professor of Latin, Sanskrit, and General Linguistics.*
724 East University Avenue.
- HUGO PAUL THIEME, PH.D., *Assistant Professor of French.*
1209 East University Avenue.
- JAMES BARKLEY POLLOCK, Sc.D., *Assistant Professor of Botany.*
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- EWALD BOUCKE, PH.D., *Assistant Professor of German.*
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- GEORGE PLUMER BURNS, PH.D., *Assistant Professor of Botany and Director of the Botanical Garden.* 605 Oxford Road.
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- DAVID MARTIN LICHTY, PH.D., *Assistant Professor of General Chemistry.* 922 Olivia Avenue.
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- ARTHUR WHITMORE SMITH, PH.D., *Assistant Professor of Physics.* 1008 Oakland Avenue.
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- WILLIAM D. HENDERSON, PH.D., *Assistant Professor of Physics.* 1001 Forest Avenue.
- WALTER BURTON FORD, PH.D., *Assistant Professor of Mathematics.* 905 Forest Avenue.
- RALPH HAMILTON CURTISS, PH.D., *Assistant Professor of Astro-Physics.* 1021 East Huron Street.
- ERMINE COWLES CASE, PH.D., *Assistant Professor of Historical Geology and Paleontology.* 1609 South University Avenue.
- CHARLES HUGHES JOHNSTON, PH.D., *Assistant Professor of Education.* 1101 East University Avenue.
- OTTO CHARLES GLASER, PH.D., *Assistant Professor of Zoology.* 1004 Oakland Avenue.
- CARL EDGAR EGGERT, PH.D., *Assistant Professor of German.* 930 Church Street.
- WILLIAM JAY HALE, PH.D., *Assistant Professor of General Chemistry.* 633 Church Street.
- CHARLES S. BERRY, PH.D., *Acting Assistant Professor of Education.* 618 Church Street.

- EDWARD BRIND ESCOTT, M.S., *Instructor in Mathematics.*
1825 Hill Street.
- WILLIAM GABB SMEATON, A.B., *Instructor in General Chemistry.*
1114 Prospect Street.
- GEORGE LIVINGSTONE HAMILTON, PH.D., *Instructor in French.*
726 South State Street.
- DANA BRACKENRIDGE CASTEEL, PH.D., *Instructor in Zoology*
1117 Prospect Street.
- RICHARD DENNIS TEALL HOLLISTER, A.M., *Instructor in Oratory.*
1505 South University Avenue.
- CALVIN HENRY KAUFFMAN, PH.D., *Instructor in Botany.*
1020 Michigan Avenue.
- JOHN WILLIAM BRADSHAW, PH.D., *Instructor in Mathematics.*
935 Greenwood Avenue.
- KARL WILHELM ZIMMERSCHIED, M.S., *Instructor in Metallurgy and Quantitative Analysis.*
522 Monroe Street.
- LEE HOLT CONE, PH.D., *Instructor in Organic Chemistry.*
1216 Prospect Street.
- SAMUEL COLVILLE LIND, PH.D., *Instructor in General and Physical Chemistry.*
912 Monroe Street.
- CHARLES BRUCE VIBBERT, A.B., *Instructor in Philosophy.*
430 South Fifth Avenue.
- J. LESLIE FRENCH, PH.D., *Instructor in Semitics.*
215 South State Street.
- JOHN GARRETT WINTER, PH.D., *Instructor in Greek.*
1414 Washtenaw Avenue.
- WALTER FRED HUNT, A.M., *Instructor in Mineralogy.*
429 South Division Street.
- ALEXANDER GRANT RUTHVEN, PH.D., *Instructor in Zoology and Curator of the Museum.*
1110 Oakland Avenue.
- JOHN FREDERICK SHEPARD, PH.D., *Instructor in Psychology.*
1605 South University Avenue.
- LEE MILTON HOLLANDER, PH.D., *Instructor in German.*
530 South Division Street.
- IRVING DAY SCOTT, A.M., *Instructor in Physiographical Geology.*
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- LOUVILLE EUGENE EMERSON, PH.D., *Instructor in Philosophy.*
725 New Jersey Avenue.
- ARTHUR SPERRY HEGNER, PH.D., *Instructor in Zoology.*
1926 Geddes Avenue.

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- ROBERT WILHELM PEARSE, PH.D., *Instructor in Zoology.*
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- HENRI THEODORE ANTONIE LENG HUS, PH.D., *In-*
structor in Botany. 609 Monroe Street.
- JACOB KUNZ, PH.D., *Instructor in Physics.* 1114 Forest Avenue.
- ROLLIN CRATEN ALLEN, A.M., *Instructor in Economic*
Geology. 407 South Fifth Avenue.
- WILLIAM HOYT WORRELL, PH.D., *Instructor in Semitic*
Languages. 1112 Washtenaw Avenue.
- FRANK LEVERETT, B.S., *Lecturer on Glacial Geology.*
312 North Thayer Street.
- CHARLES WILFORD COOK, M.S., *Instructor in Mineralogy.*
Summer Session of 1909. 429 South Division Street.

ANNOUNCEMENT

OF THE

GRADUATE SCHOOL

GENERAL INFORMATION

The University of Michigan

The University of Michigan is a part of the public educational system of the State. The governing body of the institution is a Board of Regents, elected by popular vote for terms of eight years, as provided in the Constitution of the State. In accordance with the law of the State, the University aims to complete and crown the work that is begun in the public schools, by furnishing ample facilities for liberal education in literature, science, and the arts, and for thorough professional study of engineering, medicine, law, pharmacy, and dentistry. Through the aid that has been received from the United States and from the State, it is enabled to offer its privileges, with only moderate charges, to all persons of either sex, who are qualified for admission. In the several faculties there were in 1908-1909, about 400 officers of instruction. Including the enrollment of the Summer Session, about 5,300 students, representing 50 States and Territories, and 24 foreign countries, were in attendance.

The Department of Literature, Science, and the Arts

In the Department of Literature, Science, and the Arts, the aim is to cover the broad field of general university study of the ancient and the modern languages and literatures, of history, philosophy, science, and the liberal arts, as distinguished from the more special work of the professional schools. Its Faculty numbered, in 1908-1909, about 175, including assistants. The students in attendance during the academic session numbered about 1,900, of whom about 185 were members of the Graduate School. Including the Summer Session of 1908, the total enrollment in the Graduate School was 256. See pages 135 to 147. The presence of such a number of graduate students, together with the fact that high specialization of work is not uncommon among undergraduates, tends to create a genuine university atmosphere, and to assure the advanced student of intellectual comradeship.

The Graduate School

The first graduate student at the University is recorded in the catalogue of 1856. The degrees of Master of Arts and of Master of Science were earliest conferred, the degree of Doctor of Philosophy being offered for the first time in 1875. Changes made in studies in 1877-1878 had an important bearing on graduate work at the University. This was due to the multiplication of electives and the introduction of the credit system. The seminary method of instruction began then to assume considerable proportions, and the movement was helped along by a growing demand for better trained teachers.

In the spring of 1892 the Graduate School was organized in connection with the Department of Literature, Science, and the Arts. Its purpose is to bring into increased prominence the numerous advanced courses offered in that department, and to recognize and announce them as something distinct from the work of an ordinary college course. It aims to make provision for a more systematic and efficient administration of higher work, and, so far as possible, for the separate instruction of graduate students. It lays emphasis, therefore, upon university (as distinguished from collegiate) work. The management of the School is entrusted to an Administrative Council which consists of twelve members of the Faculty of the Literary Department appointed by the President. Application for admission to the School are made to the Secretary of this Council.

ADMISSION AND REGISTRATION

Admission

The privileges of the Graduate School are open to graduates of the Department of Literature, Science, and the Arts of this University, and to graduates of other universities and colleges who satisfy the Administrative Council that they are qualified to pursue with profit the advanced courses of study offered in the School. But admission to study in the School does not imply necessarily admission to candidacy for a degree. The requirements made of candidates for higher degrees may be found on pages 15 to 20.

Graduates of other institutions whose course of study is not substantially equivalent to that prescribed at this University are required to do an additional amount of undergraduate work before being admitted to formal candidacy for an advanced degree.

For information in regard to enrollment for graduate study in the Summer Session, see page 20.

Registration

All applicants for admission to the Graduate School must present themselves with their credentials to the Secretary of the Administrative Council. Applications for admission to the Graduate School are subject to the final approval of the Administrative Council.

All students of the Graduate School, *whether registered in a previous year or not*, are required to register with the Secretary of the Administrative Council at the beginning of *each year* of residence. *Such registration must be made at the beginning of the year to ensure recognition of meeting the residence requirement.*

Blanks showing the course of study the student is pursuing must be filed at the beginning of *each semester or summer session* with the Secretary of the Graduate School.

Students who are within three hours of completing their undergraduate course at this University, while they may not be registered in the Graduate School, are permitted to count the semester in which they complete their undergraduate requirements as part of the residence requirements for the master's degree, provided they regularly elect and pursue graduate courses under the responsible committee.

Students who finish the undergraduate course of this University at the end of the first semester and who continue their residence for the remainder of the year, are permitted to register in the School and thus secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

Applicants, who do not wish to become candidates for a degree, may be admitted and registered as special graduate students. Such graduate students must designate, and have approved, the general lines of study which they wish to pursue.

Students who withdraw from the University during the academic year are requested to inform the Secretary without delay of such withdrawal.

Changes of subjects originally selected must be reported to the Council for approval.

DEGREES

Admission to Candidacy

Admission to candidacy for a higher degree is granted only to Bachelors of this University or of other universities or colleges of similar standing, or to students whose preparation for graduate study is beyond all question fully equivalent to that represented by the undergraduate course of this University. Recognition of candidacy requires the approval of the Administrative Council.

Graduate study for a degree will naturally be along lines in which the candidate has had special preparation.

Except as stated below (pages 18 and 21) one year of residence study is required of all candidates for a degree. Registration should be made and subjects of study announced as early as possible, and *this must be done immediately* at the opening of the academic year in order to ensure meeting the residence requirement.

University System

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. When a choice of studies has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a master's degree.

Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within one week after the opening of each semester or summer session*, the particular branches of study to which they wish to give special attention. The supervision of their work will then be entrusted to the proper committee.

Degrees Conferred

The degree conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees—A.M., M.S.

A candidate who has been admitted to study for the master's degree, may be recommended for the degree after one year of resident study at this University, provided he passes a satisfactory examination on the subjects of study approved by the Administrative Council. The work done in residence is mainly in pursuing courses of study regularly announced, but private work is often undertaken under special direction.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

Candidates for the master's degree may pursue their work under either of the following plans:

A

1. Candidates shall choose a major study, and two minor studies, to each of which approximately one-half of the work necessary for the major shall be devoted. The major and one minor may fall within the same department; but, unless otherwise determined by the Administrative Council, the second minor shall be chosen in another department.

2. Every candidate shall submit his choice of studies to the Administrative Council for approval. This Council shall constitute a court of appeal for any candidate whenever the wisdom of his choice is called in question.

3. At the conclusion of the first semester of study the candidate shall be required to pass an examination (written or oral or both), or to present an essay or piece of research (so far as completed), as the professor in charge of the course may determine.

4. At the close of the course, the committee in charge of the candidate's work shall conduct a final examination, which may be written or oral or both.

NOTE.—It is the intention that candidates pursuing their work on the foregoing plan shall specialize in some field of scholarship or research.

B

1. Candidates shall choose from courses published in the Annual Announcement of the Graduate School not more than 13 hours of work in each semester. These hours may be distributed over as many as three departments in one of which study shall be pursued throughout the entire course.

2. With the permission of the Administrative Council a candidate may choose in addition to the 13 hours of graduate work not more than four hours of undergraduate work in each semester.

3. Every candidate shall submit his choice of studies to the Administrative Council of the Graduate School for approval.

4. The work of candidates shall be under the charge of a committee consisting of the heads of departments in which work is taken.

5. At the end of each semester the candidates shall be required to pass a special examination (oral or written or both) in each branch of study, as the professor in charge of the course may determine.

6. At the conclusion of the course, the committee in charge of the candidate's work shall designate not less than three examiners, who shall conduct a final examination, in such manner as they may see fit, on all graduate work taken by the candidate.

NOTE.—It is intended that candidates pursuing their course on the foregoing plan shall be at liberty to supplement their baccalaureate work rather than be required to specialize along a single definite line. It is not the primary intention that this year of master's

work shall count toward a doctorate, unless the committee of heads of departments in charge of the candidate's work recommend decidedly to the contrary.

The practice of allowing students to enter upon studies *in absentia* as candidates for a master's degree has been discontinued. But a graduate of this University, who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.* Candidates for the master's degree who find it necessary thus to complete a portion of their work *in absentia* are required to petition the Administrative Council through the Secretary for such privilege, and if their petition is granted, they must keep the Secretary informed of their continued connection with the School and of the progress of their work.

The Doctors' Degrees—Ph.D., Sc.D.

The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. This rule may be waived in the case of those who come properly accredited from a graduate school of some other university, and of those, who as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.

It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study. The candidate must also evince ability to carry on independent research. No definite term of required residence can, therefore, be specified. As a rule, three years of graduate study are necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work. Candidates who already hold the master's degree usually find it possible to prepare for the doctor's examination after two years of further study along the same lines of work pursued for the master's degree.

A student wishing to become an applicant for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

No student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research.

A candidate for a doctor's degree must choose a major study that is substantially co-extensive with some one department of in-

struction in the University. He must also choose two minor studies, one of which may be in the same department as the major, but which involves a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council. A portion of the work for a doctor's degree consists in pursuing regularly announced courses of instruction, but in general a large amount of time is devoted to individual study and research under the immediate supervision of the committee in charge. This is especially true in the preparation of the thesis.

The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may at their option receive the degree of Doctor of Science.

The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but its acceptance depends more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final resume of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

The thesis must be completed and a good legible copy must be put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of this thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. To guarantee the printing of the thesis, he is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his

own expense, or shall have it published in a form and under auspices approved by the responsible committee. The candidate is required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended. The thesis must be bound with cover and title-page, and the latter, in addition to the title and name of the author, must bear the following inscription: A Thesis submitted to the Faculty of the Department of Literature, Science, and the Arts of the University of Michigan for the degree of Doctor of Philosophy (or of Science). A plan of the proposed title-page of the thesis must be submitted to the Librarian of the University for his approval. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

Examinations

The final examinations of candidates for the higher degrees are commonly held during the first two weeks in June, but the examination can usually be arranged at any time when a candidate has fulfilled all the technical requirements and has satisfied his instructors that his work has been such as to warrant an examination.

Ordinarily the examinations are oral, and in each case they are held before those comprising the special committee in charge of the candidate's work and before such others as may be present by invitation of this committee. They may be preceded by such written tests as individual instructors consider necessary.

For information concerning the examination of candidates for the master's degree see page 17.

SUMMER SESSION

Graduate students, who are regularly matriculated in the University, may carry on work during the Summer Session which will count toward an advanced degree. Graduates of other universities or colleges of similar standing, who are competent to enroll for a higher degree, may, upon the payment of a fee of twenty-five dollars, matriculate in the University and begin graduate study in the Summer Session. This fee of twenty-five dollars includes the regular matriculation fee and the fee for the current Summer Session.

Candidates for the master's degree, if graduates of the University of Michigan, may present themselves for examination after

attendance upon three Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Candidates for the master's degree, if graduates of other approved institutions, may present themselves for examination after attendance upon four Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

Many teachers avail themselves of this opportunity to begin graduate work, and later return to the University to complete the requirements for a higher degree. The number of courses in the Summer Session designed especially for graduates is large and constantly increasing. In many respects the advantages afforded for advanced study are distinctly superior to those enjoyed during the academic year. These advantages are found in the smaller classes, in the freer use of the facilities of libraries, laboratories and museums, but especially in that more direct, intimate and personal contact with the professor in charge which adds so greatly to the satisfaction and efficiency of specialized work.

The graduate courses to be offered in the Summer Session of 1909 are described in this Bulletin following the announcement of courses in each department for the academic year, 1909-1910.

In addition to the courses regularly announced for graduate instruction, it should be noted that all professors giving work during the Summer Session will gladly arrange and direct the work of graduate students competent to enroll for a degree, who may desire to work along lines for which specific courses have not been provided.

FEES AND EXPENSES

The Matriculation Fee and the Annual Fee must be paid in advance. Except by order of the Board of Regents, no portion of these fees can be refunded to students who leave the University during the academic year.

Matriculation Fee.—Every student before entering any department of the University is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

Annual Fee.—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee in the Department of Literature, Science, and the Arts is, for Michigan

students, thirty dollars; for all others, forty dollars. It is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. Graduate students studying in *absentia* for a master's degree pay an annual fee of ten dollars.

The matriculation fee and the annual fee must be paid at the beginning of the academic year. A by-law of the Board of Regents provides that no student or students shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

Holders of fellowships and of scholarships are required to pay the matriculation fee (if not already paid), the annual fees, the diploma fee, laboratory expenses, and other similar charges, the same as other students of the department in which their work lies.

Fee for Summer Session.—The fee for the Summer Session of the Department of Literature, Science, and the Arts, for graduate students, who have already matriculated, is twenty dollars regardless of the number of courses taken. For non-matriculantes the fee is twenty-five dollars, which includes the regular matriculation fee and the fee for the current Summer Session.

Laboratory Expenses.—Students who pursue laboratory courses of study are required to pay for materials and apparatus actually consumed by them. The laboratory expenses thus depend upon the student's prudence and economy. Experience has shown that in the chemical laboratory the average expenditure for all courses is about one dollar and twenty cents a week. The deposits required in advance vary with the courses taken, ranging from one to twenty dollars.

Diploma Fee.—The fee for the diploma given on receiving an advanced degree is ten dollars. The Treasurer's receipt for the diploma fee must be submitted to the Secretary of the Graduate School before a candidate will be permitted to take the final examination for an advanced course. A by-law of the Board of Regents prescribes that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

Other Expenses.—Students obtain board and lodging in private families for from three to five dollars a week. Clubs are also formed in which the cost of board is from one dollar and a half to two dollars and a half a week. Room rent varies from one dollar to three dollars a week for each student. The annual expenses of students, including clothing and incidentals, are, on the average, about three hundred and seventy-five dollars. Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University in University Hall.

THE LIBRARIES

The libraries of the University are the General Library, the Engineering, the Medical, the Law, the Homœopathic, and the Dental Libraries. On January 1, 1909, they contained a total of 241,107 volumes, 3,592 maps, and a collection of 4,000 prints and photographs, mainly of art subjects. Among the special collections in the General Library are the Parsons Collection, containing 6,076 volumes, chiefly on political economy; the McMillan Shakespeare Collection of 6,525 volumes and 174 pamphlets; and the Goethe Collection of 1,131 volumes. The University libraries regularly receive 1,424 periodicals. During the Summer Session the General Library will be open daily, except Sunday, from 7:45 A. M. to 10 P. M. Books may be drawn by all officers and students of the University and by others having special permission. The reading room for general use will seat 270 readers. Separate rooms are provided for advanced students where work is pursued with the necessary books at hand. The reading room in the Law Library provides chairs and desk room for 224 persons.

THE ASTRONOMICAL OBSERVATORY

The University Observatory was founded in 1852, through the liberality of citizens of Detroit, and on this account it was named the Detroit Observatory. It is situated on the northeastern border of the city of Ann Arbor, about half a mile from the University Campus. Its principal instruments are a refracting telescope of twelve and one-fourth inches clear aperture, originally constructed by Henry Fitz of New York, but largely rebuilt in 1906-7 in the Observatory Instrument Shop; and a six-inch meridian circle, made by Pistor & Martins of Berlin in 1854, and presented to the Observatory by Henry N. Walker of Detroit. It has also a six-inch equatorial telescope, with objective by Alvan Clark & Sons, mounting by Fauth & Company, and supplied with a new driving clock made in the Observatory Shop in 1908; a three-inch meridian transit, with zenith telescope attachment by Fauth & Company; a four and one-half inch comet seeker, made in the Observatory Shop; mean and sidereal clocks by Tiede and Howard; altazimuth instrument by Wurdemann; theodolite by Brandis; Millionaire and Brunsviga computing machines, chronometers, chronograph, transit, sextants, etc.

A large reflecting telescope is being constructed for the Observatory, and it is expected that it will be erected during the present year. The optical parts of this instrument are from the works of the John A. Brashear Company of Allegheny. The parabolic mirror has an outside diameter of $37\frac{5}{8}$ inches, and the diameter of its silvered surface is $37\frac{3}{8}$ inches. This telescope will be

mounted equatorially, and is provided with flat and hyperbolic secondaries, so that it may be used either as a Newtonian or as a Cassegrain reflector. It is intended primarily for photographic and spectroscopic work, and a modern spectroscope for use in connection with it has been constructed by the John A. Brashear Company. The same firm has also supplied an engine for the measurement of spectrograms.

A shop, supplied with excellent machine and hand tools, is maintained at the Observatory for the repair and construction of instruments.

The meridian circle and the twelve and one-fourth inch refractor are installed in the original Observatory building, the west wing of which contains the Observatory Library, and connects with the residence of the Director.

A new building is now being constructed, adjoining the original one on the east, and containing a dome for the new reflecting telescope. It will also have offices, laboratory, class and computing rooms. A set of modern seismographs, for the registration of vibrations caused by earthquakes, will be installed in the new building. These include instruments in the Bosch-Omori and Wiechert types, with mechanical registration of the vertical and two horizontal components of the motion.

The six-inch refractor and the three-inch meridian transit are mounted in a small observatory near the main building, and are used principally for purposes of instruction.

The larger instruments of the Observatory are intended for research, and will be available to that end for such students as have the technical ability to use them to advantage.

For many years the Observatory has been receiving the principal astronomical publications and its technical library is reasonably complete, including in round numbers about 2,500 volumes. These comprise nearly all the printed star catalogues, most of the modern publications of observatories and astronomical societies, and nearly complete files of the astronomical periodicals.

THE LABORATORIES

Physical Laboratory

The Physical Laboratory has recently been greatly enlarged by the addition of a new lecture room and increased space for laboratory work. This enlargement permits the department to devote the smaller rooms to advanced and graduate work. Hereafter work in electrochemistry, sound and light, heat, and electrical measurements will be conducted in separate suites of rooms, and special provision will be made for graduate students. In fact, important researches for graduate theses will have separate rooms set aside

for their accommodation. The apparatus for the advanced courses is already extensive, and additions are made every year to meet the needs of graduate students.

Chemical Laboratory

A new fire-proof building devoted wholly to the various branches of Chemistry is now being erected at a cost of about \$250,000. It is expected that it will be ready for occupancy in October, 1909. This new laboratory will greatly improve the facilities for graduate work.

The present Chemical Laboratory has a floor space of over fifty thousand square feet. About fifty courses are offered during the college year, most of which involve laboratory work. The building contains a reading room in which are shelved the most frequently required reference books and a few duplicate sets of chemical journals. The main portion of the Chemical Library is readily accessible in the adjacent library building, and is especially valuable to the research student because of its complete sets of forty-nine journals devoted wholly or in large degree to Chemistry.

In addition to a full supply of routine materials and apparatus for work in General, Analytical, Organic, Physical, Pharmaceutical and Technological Chemistry, facilities are offered for advanced study and research along many lines, including apparatus for the preparation of raw materials, a continuous extraction apparatus, a hydraulic press capable of exerting a pressure of five thousand pounds per square inch, a filter press and a power-driven centrifugal machine. Direct current is available at various voltages from storage batteries, rotary transformers, and a 220-volt power plant for electrochemical or electrothermal work. Advanced students have also at their disposal various types of resistance, resistor and arc furnaces, as well as oil and gas fired furnaces for high temperature work, and both electrical and optical pyrometers. Special facilities are provided for the preparation of microscopic or photomicrographic examination of specimens either in thick polished section by vertical illumination or in thin section by either plane or polarized light. Five ventilated dark rooms provide for spectroscopic, photometric, and photographic work and experiments in refraction. Sixty analytical balances are distributed in four balance rooms and in private laboratories, and others for heavier loads or of greater delicacy are reserved for special purposes.

Mineralogical Laboratory

This laboratory occupies ten rooms in the basement of Tappan Hall and has a total area of over 6,000 square feet. One large room is used for general laboratory purposes, another is devoted to blowpipe methods and chemical crystallography, while a third is used for petrography, crystal measurements and drawing. Another large room contains the display and study collection of minerals.

University System

Every graduate student who is a candidate for a higher degree, works upon the so-called "university system," the essential features of which are specialization of study, a final examination, and a thesis. When a choice of studies has been made and approved, the student's work is henceforth under the immediate supervision of a committee consisting of those professors who have charge of the studies chosen. This committee arranges a course of study suited to the desires, needs, and previous attainments of the student, assists him in the choice of a subject for a thesis, passes judgment upon his thesis when it is written, conducts his examination, and, if he passes, reports him to the Council as worthy of the degree sought. The nature of the work prescribed, and of the committee's supervision, varies more or less according to the subject chosen, the degree sought, and the previous attainments of the student. The work may consist of attendance upon certain specified courses of study, of reading to be done privately and reported upon, or of original research to be carried on more or less independently. The requirement of a thesis is sometimes waived in the case of a candidate for a master's degree.

Applicants for an advanced degree are required to announce to the Council, through the Secretary, *within one week after the opening of each semester or summer session*, the particular branches of study to which they wish to give special attention. The supervision of their work will then be entrusted to the proper committee.

Degrees Conferred

The degree conferred on the completion of approved courses of study in the Graduate School are Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science.

The Masters' Degrees—A.M., M.S.

A candidate who has been admitted to study for the master's degree, may be recommended for the degree after one year of resident study at this University, provided he passes a satisfactory examination on the subjects of study approved by the Administrative Council. The work done in residence is mainly in pursuing courses of study regularly announced, but private work is often undertaken under special direction.

The degree of Master of Arts is the one usually conferred, though candidates who pursue studies along scientific lines may, at their option, receive the degree of Master of Science.

Candidates for the master's degree may pursue their work under either of the following plans:

A

1. Candidates shall choose a major study, and two minor studies, to each of which approximately one-half of the work necessary for the major shall be devoted. The major and one minor may fall within the same department; but, unless otherwise determined by the Administrative Council, the second minor shall be chosen in another department.

2. Every candidate shall submit his choice of studies to the Administrative Council for approval. This Council shall constitute a court of appeal for any candidate whenever the wisdom of his choice is called in question.

3. At the conclusion of the first semester of study the candidate shall be required to pass an examination (written or oral or both), or to present an essay or piece of research (so far as completed), as the professor in charge of the course may determine.

4. At the close of the course, the committee in charge of the candidate's work shall conduct a final examination, which may be written or oral or both.

NOTE.—It is the intention that candidates pursuing their work on the foregoing plan shall specialize in some field of scholarship or research.

B

1. Candidates shall choose from courses published in the Annual Announcement of the Graduate School not more than 13 hours of work in each semester. These hours may be distributed over as many as three departments in one of which study shall be pursued throughout the entire course.

2. With the permission of the Administrative Council a candidate may choose in addition to the 13 hours of graduate work not more than four hours of undergraduate work in each semester.

3. Every candidate shall submit his choice of studies to the Administrative Council of the Graduate School for approval.

4. The work of candidates shall be under the charge of a committee consisting of the heads of departments in which work is taken.

5. At the end of each semester the candidates shall be required to pass a special examination (oral or written or both) in each branch of study, as the professor in charge of the course may determine.

6. At the conclusion of the course, the committee in charge of the candidate's work shall designate not less than three examiners, who shall conduct a final examination, in such manner as they may see fit, on all graduate work taken by the candidate.

NOTE.—It is intended that candidates pursuing their course on the foregoing plan shall be at liberty to supplement their baccalaureate work rather than be required to specialize along a single definite line. It is not the primary intention that this year of master's

work shall count toward a doctorate, unless the committee of heads of departments in charge of the candidate's work recommend decidedly to the contrary.

The practice of allowing students to enter upon studies *in absentia* as candidates for a master's degree has been discontinued. But a graduate of this University, who has already completed a considerable portion of the term of residence prescribed for a master's degree, may be allowed to continue his studies for the degree, without further residence at the University, on such conditions as the Administrative Council may determine in each case. *This privilege is restricted to graduates of this University.* Candidates for the master's degree who find it necessary thus to complete a portion of their work *in absentia* are required to petition the Administrative Council through the Secretary for such privilege, and if their petition is granted, they must keep the Secretary informed of their continued connection with the School and of the progress of their work.

The Doctors' Degrees—Ph.D., Sc.D.

The doctors' degrees are open to all persons who have received a bachelor's degree, but no student will be enrolled as a candidate for a doctor's degree until he has been in residence as a graduate student for at least one year. This rule may be waived in the case of those who come properly accredited from a graduate school of some other university, and of those, who as undergraduates in this University, have shown special proficiency in the line of their proposed graduate work.

It is not intended that the doctor's degree shall be won merely by faithful and industrious work for a prescribed time in some assigned course of study. The candidate must also evince ability to carry on independent research. No definite term of required residence can, therefore, be specified. As a rule, three years of graduate study are necessary, the last two semesters of which must be spent at this University. The period of three years, however, may be shortened in the case of students who, as undergraduates, have pursued special studies in the direction of their proposed graduate work. Candidates who already hold the master's degree usually find it possible to prepare for the doctor's examination after two years of further study along the same lines of work pursued for the master's degree.

A student wishing to become an applicant for a doctor's degree must make a formal application to be so enrolled at least two semesters prior to the time for presenting himself for examination.

No student will be accepted as a candidate for a doctor's degree who has not a knowledge of French and German sufficient for purposes of research.

A candidate for a doctor's degree must choose a major study that is substantially co-extensive with some one department of in-

struction in the University. He must also choose two minor studies, one of which may be in the same department as the major, but which involves a more thorough treatment of the same. Both minors must be cognate to the major, and all studies must be subject to the approval of the Administrative Council. A portion of the work for a doctor's degree consists in pursuing regularly announced courses of instruction, but in general a large amount of time is devoted to individual study and research under the immediate supervision of the committee in charge. This is especially true in the preparation of the thesis.

The degree of Doctor of Philosophy is the one usually conferred, though candidates who pursue studies along scientific lines may at their option receive the degree of Doctor of Science.

The thesis is of great importance. It must exhibit creditable literary workmanship, and a good command of the resources of expression, but its acceptance depends more upon its subject-matter than upon its formal or rhetorical qualities. It must be an original contribution to scholarship or to scientific knowledge. The inquiry should be confined within narrow bounds. The treatment should be as concise as the nature of the subject permits, and show familiarity with the history of the problem treated, with the literature bearing upon it, and with the latest methods of research applicable to it. Every thesis should contain a clear introductory statement of what it is proposed to establish or investigate, and likewise a final resume of results. It should also be accompanied by an index of contents and a bibliography of the subject. It is expected that the preparation of an acceptable thesis will usually require the greater part of an academic year.

The subject of the thesis for a doctor's degree must be chosen, and must be approved by the committee concerned, as early as the first of November of the college year in which the applicant expects to take his degree, and the subject of the thesis for a master's degree, when required, must be chosen and approved as early as the first of December.

The thesis must be completed and a good legible copy must be put into the hands of the chairman of the proper committee as early as the first of May of the year in which the applicant expects to take the degree.

Every candidate for the degree of Doctor of Philosophy or Doctor of Science, in case of the acceptance of this thesis, is required to have the thesis printed in full or in part, as may be approved by the responsible committee. To guarantee the printing of the thesis, he is required to deposit with the Treasurer of the University, between the date of the acceptance of the thesis and the time fixed for his examination, the sum of fifty dollars. This deposit will be returned to him in case of failure to pass his examination, or whenever he shall cause his thesis to be printed at his

own expense, or shall have it published in a form and under auspices approved by the responsible committee. The candidate is required to deposit one hundred and fifty copies of the printed thesis in the University library, these copies to be used for exchange with other universities. Provision has been made, however, that in cases where this requirement would work hardship, it may be waived on recommendation of the candidate's committee.

In the printing of the thesis at his own expense the candidate will be expected to use good, substantial paper, and slightly typography. A page four inches by six, with outside margins of at least one inch, is recommended. The thesis must be bound with cover and title-page, and the latter, in addition to the title and name of the author, must bear the following inscription: A Thesis submitted to the Faculty of the Department of Literature, Science, and the Arts of the University of Michigan for the degree of Doctor of Philosophy (or of Science). A plan of the proposed title-page of the thesis must be submitted to the Librarian of the University for his approval. In case the thesis is not immediately printed, a type-written copy must be placed in the University library.

Examinations

The final examinations of candidates for the higher degrees are commonly held during the first two weeks in June, but the examination can usually be arranged at any time when a candidate has fulfilled all the technical requirements and has satisfied his instructors that his work has been such as to warrant an examination.

Ordinarily the examinations are oral, and in each case they are held before those comprising the special committee in charge of the candidate's work and before such others as may be present by invitation of this committee. They may be preceded by such written tests as individual instructors consider necessary.

For information concerning the examination of candidates for the master's degree see page 17.

SUMMER SESSION

Graduate students, who are regularly matriculated in the University, may carry on work during the Summer Session which will count toward an advanced degree. Graduates of other universities or colleges of similar standing, who are competent to enroll for a higher degree, may, upon the payment of a fee of twenty-five dollars, matriculate in the University and begin graduate study in the Summer Session. This fee of twenty-five dollars includes the regular matriculation fee and the fee for the current Summer Session.

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attendance upon three Summer Sessions of this University, supplemented by satisfactory work done *in absentia* under the direction of the proper committee.

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d. The modern Indian section, including wearing apparel, implements of war and the chase, and household utensils of the South American, North American, and the Alaskan Indians, and a fine example of the Alaskan totemic column.

e. The Stone Age section, including the local collection of the late David De Pue, a series of Danish implements, and a series of casts of rare implements prepared by the Smithsonian Institution.

Special Collections and Museums

THE BOTANICAL COLLECTION is shelved in the Botanical Laboratory, and contains, in addition to Michigan plants collected by the public surveys, several valuable herbaria and sets of plants that have been presented to the University from time to time. Among these some of the most important are the HOUGHTON HERBARIUM, the SAGER HERBARIUM, the AMES HERBARIUM, the HARRINGTON COLLECTION, the BEAL-STEERE BOTANICAL COLLECTION, the ADAM-JEWETT COLLECTION, and the GARRIGUES COLLECTION.

The collections in PHARMACOGNOSY and INDUSTRIAL CHEMISTRY occupy a floor space of 2,500 square feet in the chemical building. The Pharmacognosy Collection comprises several thousand mounted and labeled specimens of products from all parts of the world, such as are used for medicinal, alimentary, and industrial purposes. The cultivation and preparation for the market and the commerce of these articles among the peoples of the earth, are illustrated by collections of authentic photographs, many of which have been expressly procured for the study of commerce with distant parts of the world.

The collection in Industrial Chemistry illustrates the natural resources and chief manufactures of Michigan, and of various parts of the world. Crude materials, raw and unfinished products, as well as completed articles of commerce in their several grades are displayed, together with models and plans of production by modern methods.

Museum of Fine Arts and History

The works of art belonging to the University are on exhibition in the galleries provided for them in the library building. A printed catalogue, prepared by Professor Martin L. D'Ooge, contains fuller descriptions than can here be given. The collection was begun in 1855. It contains a gallery of casts in full size and in reduction of some of the most valuable ancient statues and busts, such as the Hermes of Praxiteles, the Apollo Belvedere, the Laocoon, the Wrestlers and the Sophocles; casts of the sculptural decorations from the arch of Trajan at Benevento, presented by the class of 1896; more than two hundred reductions and models in terra cotta and other materials; the statue of Nydia by Randolph Rogers; casts of modern statues, busts, etc., and reliefs; a number of engravings and photographic views, illustrating especially the archi-

tectural and sculptural remains of Ancient Italy and Greece; a small collection of engraved copies of the great masterpieces of modern painting; two series of historical medallions—the HORACE WHITE COLLECTION and the GOVERNOR BAGLEY COLLECTION—the former illustrative of ancient, mediæval, and modern European history, the latter designed to embrace the commemorative medals struck by order of Congress or other authorities, and now containing one hundred such medals; and a large collection of coins, chiefly Greek and Roman, presented to the University by the late Dr. Abraham E. Richards.

THE ROGERS GALLERY comprises the entire collection of the original casts of the works of the late Randolph Rogers, more than a hundred in number. It was given by that distinguished sculptor to the State of Michigan for the University museum.

THE LEWIS GALLERY, bequeathed to the University by the late Henry C. Lewis, of Coldwater, comprises about four hundred and fifty paintings and forty pieces of statuary.

THE DE CRISCIO COLLECTION OF LATIN INSCRIPTIONS, about 260 in number, ranging in age from the reign of Augustus to the 5th century, A. D. Most of the inscriptions are on slabs of marble. This collection was acquired in 1899 through the generosity of Mr. Henry P. Glover, of Ypsilanti.

The late J. Q. Adams Fritchey, A.M., of St. Louis, Mo., a graduate in the Class of 1858, bequeathed to the University a collection of modern coins, medals, and medallions, numbering about one thousand, issued prior to 1876, and possessing historic value and interest to numismatics.

Dr. Henry Smith Jewett (A.B., 1868), of Dayton, Ohio, has recently presented to the University a complete set of the various issues of fractional currency issued by the United States government during the Civil War and Reconstruction periods. Accompanying this collection is a nearly complete set of the "documentary" stamps issued by the government during the Civil War.

A small but valuable collection of Egyptian antiquities has recently been presented to the University by A. M. Todd, of Kalamazoo, Mich.

SOCIETIES

There are connected with the University a number of voluntary literary, philosophical, and scientific organizations which add not a little to the graduate student's opportunity for general training. The membership of these societies consists usually of University teachers and advanced students who are pursuing a common specialty. They are variously organized and meet weekly, fortnightly, or monthly, as the case may be, for the reading and discussion of formal papers, for reports upon observation and experi-

ment, reviews of recent literature, etc. These societies are the following:

The Philological Society, the Classical Journal Club, the Romance Journal Club, Cercle Français, the Germanic Journal Club, the Spanish Club, the Scandinavian Club, University Oratorical Association, the Political Science Club, the Philosophical Society, the Mathematical Society, the Education Club, the Physical Colloquium, the Chemical Colloquium, the Zoological Journal Club, and the Botanical Journal Club.

FELLOWSHIPS

Elisha Jones Classical Fellowship

In 1889 the Elisha Jones Classical Fellowship was established by Mrs. Catherine E. Jones, in memory of her husband. Professor Elisha Jones, a graduate of this University in the class of 1859, and for many years a member of the Literary Faculty. Its purpose is "to encourage patient, honest, accurate study of the languages, literature, and archæology of ancient Greece and Rome."

A candidate for the Fellowship must have spent at least three entire semesters as a student in this Department of the University, and must be a Bachelor of Arts of this University of not more than two years' standing. Appointments to the Fellowship are made by an Examining Board, consisting of President Angell, and Professors D'Ooge, Kelsey and Reed. The period of incumbency is limited to two academic years, and must be spent at this University unless at any time the examining board shall see fit to allow the second year to be spent at some other place favorable to classical study.

No income has been available for the current year.

Newberry Classical Fellowship

Mrs. Helen H. Newberry, of Detroit, who gave the sum of three hundred dollars in 1904 for the maintenance of a Fellowship in the classics, continued the Fellowship for 1908-1909. The holder of the Fellowship for the year was Olive May Sutherland, A.B.

Buhl Classical Fellowship

The sum of five hundred dollars was given by Mr. Theodore D. Buhl, of Detroit, for the support of a Classical Fellowship for the year 1908-1909. The joint holders of the Fellowship for the year were Ray Eli Cleveland, A.B., and Henry Mills Gelston, A.B.

Peter White Classical Fellowship

Provision for a Classical Fellowship, with an income of three hundred dollars, was continued for the year 1908-1909 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year was Harriet Rice Congdon, A.B. (*Mount Holyoke College*).

Peter White Fellowship in American History

Provision for a Fellowship in American History, with an income of four hundred dollars, was continued for the year 1908-1909 by the Honorable Peter White, of Marquette. The holder of the Fellowship for the year 1908-1909 is John Nelson Norwood, Ph.B. (*Alfred University*).

The George S. Morris Fellowship in Philosophy

The sum of four hundred and fifty dollars was again received from Mrs. George S. Morris for the support of a Fellowship or Scholarships to be known as the George S. Morris Fellowship or Scholarships in Philosophy, in honor of George S. Morris, Professor of Modern Languages and Literature from 1870 to 1879, and of Philosophy from 1881 to 1889, and for the purchase of books for the Morris Philosophical Library. Fifty dollars were devoted to the latter purpose, and one Fellowship was awarded for the year 1908-1909 to Charles Bruce Vibbert, A.B.

Mrs. Morris will make a similar gift for 1909-1910, and the amount will be divided, or not, at the discretion of the instructors in Philosophy. Applications should be sent in before May 1, and should be accompanied by the fullest credentials.

Stearns Fellowship

A Fellowship in Pharmaceutical Chemistry is supported by Messrs. Frederick Stearns & Company, of Detroit, for investigations upon subjects determined by the University. This provision has been continued since 1895. The annual income is three hundred and fifty dollars. The holder of the Fellowship for the year 1908-1909 is Arthur Wilson Linton, Ph.G. (*Highland Park College*).

Gas Engineering Fellowship

The Michigan Gas Association has, since 1900, supported a Fellowship in Gas Engineering with an annual stipend of five hundred dollars. The Association has also each year expended an additional sum for special equipment so that there is at the present time a very complete experimental plant, occupying a two-story annex to the retort house of the Ann Arbor Gas Company, which is entirely devoted to research work prosecuted under the direction of the University authorities. The work now under way consists in the study of coals from various parts of the United States, with a view to determining their fitness for the manufacture of illuminating gas, and is being conducted with the coöperation of the United States Geological Survey. The holder of the Fellowship for the year 1908-1909 was William Albert Dunkley, B.S.

Rockefeller Fellowship

The Rockefeller Institute for Medical Research has continued its grant for a Fellowship in Hygiene and Bacteriology for the year 1908-1909. The holder of this Fellowship for the year was William Alder Perkins.

Angeline Bradford Whittier Fellowship in Botany

This Fellowship was established by Joseph Bradford Whittier, of Saginaw, in memory of his mother. The principal sum of the endowment is four thousand dollars. No appointment was made to this Fellowship for the year 1908-1909.

The Charles James Hunt Fellowships

In July, 1900, Mr. Charles James Hunt, of Detroit, a graduate of the University in the class of 1846, and wife, conveyed to the Board of Regents, in trust, the title to certain pieces of real estate, subject to Mr. Hunt's life-interest in the income to be derived therefrom, and to the life-interests of other persons named in the deed. After the termination of these life-interests "one or more Fellowships in the University of Michigan" are to be established in accordance with conditions named in the deed of trust and in accompanying documents, and are to be known as the Charles James Hunt Fellowships.

Assistantships

Thirty-seven persons holding the position of assistant in the Department of Literature, Science, and the Arts are this year enrolled in the Graduate School. These positions, of which there are about seventy-five, are made use of as far as possible to enable competent and deserving students to do graduate work. The compensation depends upon the amount and character of the work demanded, varying from \$100.00 to \$600.00.

Application for appointment should be made to the professor in charge of the department concerned.

TEACHERS' APPOINTMENT COMMITTEE

An appointment committee of the Faculty of the Department of Literature, Science, and the Arts, composed of representatives of the various departments of instruction, has been constituted for the purpose of assisting men and women who are studying, or have studied, under this Faculty, to secure positions as teachers. This service is performed gratuitously, in the interest of students of the University, past or present, and of superintendents of schools and boards of education wishing to employ teachers. Students who have

pursued advanced work along chosen lines of study naturally receive special consideration. Persons desiring to reach this committee should address their communications to the Secretary of the Appointment Committee.

MUSICAL ADVANTAGES

Graduate students interested in music have in Ann Arbor exceptional advantages, whether they wish to hear good music for recreation and as a part of a liberal education, or to pursue special studies.

The theory of music may be studied under the direction of the Professor of Music in the University, who offers several courses; applied music may be taken in the University School of Music, which furnishes instruction of University grade in Piano, Voice, Violin and Organ.

In the course of the year there are many concerts, the prices of which are fixed at cost in order to make it possible for all students to hear them. A series of ten is given by the Choral Union, a University organization maintaining a chorus of three hundred members (chiefly students), five concerts being grouped in the May Festival, at which works of the first rank are presented with full chorus and orchestra. Another series of ten concerts is given by the Faculty of the University School of Music. A third series, consisting of historical piano recitals, is given by the head of the pianoforte department in the University School of Music. There are in addition many other concerts and recitals every season.

Students who have had an adequate preliminary training may take music as either a major or a minor in connection with other graduate studies.

The University is so fortunate as to possess the great organ which was built for the Columbian Exposition in 1893. After the Exposition this was brought to Ann Arbor and set up in University Hall as a memorial to Henry S. Frieze, who was professor of Latin in the University from 1854 to 1889.

In the University Museum is the Stearns Collection of Musical Instruments, presented by Mr. Frederick Stearns, of Detroit. This collection is available for special study to students who are competent to work upon the difficult problems for the solution of which they furnish material.

Courses of Instruction

ACADEMIC SESSION

The following list of advanced courses does not attempt in all cases to discriminate graduate from undergraduate instruction; the reason being that the possession of a bachelor's degree may mean much or little as regards a student's proficiency in a particular subject. With a few exceptions, the courses here mentioned all presuppose a somewhat extensive preliminary study of the subject, a study covering from one to six or more years according to the circumstances. In some instances the attempt is made to indicate, in terms of both time and work, the amount of preparation required for entrance upon the courses described. Many of the courses are advanced electives which are open to undergraduates, but have been shown by experience to be suited to the needs of many graduates. For further information reference may be made directly to the head of the department concerned.

Although the following list of courses is as complete and accurate as possible, it is subject to change. The revised Annual Announcement of the Department of Literature, Science, and the Arts, which is issued early in September, contains fuller information regarding the courses, and their time and place of meeting for the academic session. For more detailed information concerning the work of the Summer Session consult the special Announcement of the Summer Session. These publications, as also copies of the University Calendar, may be obtained from Shirley W. Smith, Secretary of the University. In some cases special departmental announcements are also issued.

Inquiries concerning admission to the Graduate School and its courses of study should be addressed to Professor Edward H. Kraus, Secretary of the Administrative Council.

GREEK

The courses here announced presuppose, in general four years' previous study of Greek, viz., the usual preparatory course of two years, and two years of collegiate study devoted to the history of Greek literature and to reading from Xenophon, Lysias, Homer, Thucydides, the Tragic Poets, and Aristophanes.

Academic Session, 1909-1910

Professor D'OUGE:—

Teachers' Course.

Lectures on Greek Grammar; particularly with reference to the origin and history of inflections. This course is especially intended for those who are expecting to teach Greek.—*Two hours a week, first semester.*

[Lucian.

Selected dialogues. Discussion of the life and times of Lucian.—*Two hours a week, first semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

Demosthenes *de Corona* and Studies in the Attic Orators.

Three hours a week, first semester.

Seminary in Tragedy.

The Oresteian Trilogy of Aeschylus, with special reference to the most important principles of textual criticism and the dramatic art of the poet.—*Three hours a week, first semester.*

[Studies in Euripides, with special reference to the dramatic art of the poet, his use of metres, and the antiquities of the Greek stage.—*Three hours a week, first semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

Pindar.

The Olympian and Pythian Odes. Selections from Bacchylides.—*Three hours a week, second semester.*

[Introduction to the Critical Study of Homer.

Lectures on the history of the Homeric text and a study of the Homeric language and verse. This course is especially intended for those who are preparing to teach Greek.—*Three hours a week, second semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

Modern Greek.

Practical introduction and practice in reading specimens of modern Greek literature.—*Two hours a week, second semester.*

[Pausanias and the Topography and Monuments of Ancient Athens.

Two hours a week, second semester.

Omitted in 1909-1910; to be given in 1910-1911.]

History of Greek Art from the Beginning to the Roman Period.

Three hours a week, first semester.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Ancient Greek life. Athens and its Monuments.

Two hours a week, second semester.

Professor BONNER:—

Aeschylus.

The *Prometheus*, *Persians*, and *Seven Against Thebes*.—*Two hours a week, second semester.*

[The Bucolic Poets.

The Idyls of Theocritus, Bion and Moschus, with studies in the history of pastoral poetry.—*Three hours a week, first semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

[Greek Religion.

Lectures and assigned topics for investigation.—*Two hours a week, second semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

[Aristophanes.

Several plays will be read, with selections from the remainder. Studies in the development of comedy, in the dramatic structure of the plays, and in the social and political influence of Aristophanes accompany the reading.—*Two hours a week, second semester.*

Omitted in 1909-1910.]

[Euripides.

Rapid reading and interpretation of three or more plays.—*Two hours a week, second semester.*

Omitted in 1909-1910; to be given in 1910-1911.]

Aristotle's Athenian Constitution.

With special reference to the judicial and political antiquities of Athens.—*Two hours a week, second semester.*

Greek Epigraphy.

A study of the local alphabets, and exercises in reading inscriptions.—*Two hours a week, first semester.*

Dr. WINTER:—

Plato's Republic.

Rapid reading and interpretation.—*Three hours a week, first semester.*

Journal Club.

Analysis and criticism of important articles in the domain of the Greek and Latin languages and literatures, Greek and Latin grammar and lexicography, Greek and Roman history, archaeology and antiquities, by members of the classical faculty and members of the Greek and Latin seminaries.

Summer Session, 1909

Professor BONNER:—

Greek Bucolic Poetry.

Theocritus, Bion, and Moschus.

Aeschylus.

Prometheus and Persians.

Greek Palæography.

Lectures and exercises in reading from facsimiles of manuscripts.

Greek Mythology and Religion.

Lectures illustrated with the stereopticon, assigned readings, and discussions.

Of the courses announced by Professor BONNER for the Summer Session, those two will be given which are desired by the largest number of students. For hours and places of meeting, see the Announcement of the Summer Session.

LATIN

The courses here announced presuppose, in general, seven or eight years' previous study of Latin—the usual preparatory course of four years, and three or four years of collegiate study.

In connection with the work in Latin, use is made of the University collection of classical antiquities, and of reproductions of objects of ancient art. These collections are as follows:—

1. The Richards Collection of Roman Coins, containing about 500 well-selected examples, illustrating the silver and bronze coinage of the latter part of the Roman Republic and the Empire.

2. The De Criscio Collection of Latin Inscriptions. These inscriptions furnish material for an introductory course in epigraphy. They number about 250, most of them being upon slabs of marble; two are upon terra cotta cinerary urns, one upon a marble urn, and a dozen upon sections of lead pipe.

3. Reproductions of inscriptions, including squeezes, rubbings, and photographs. This collection comprises several hundred examples, taken chiefly from originals in the museums of Rome and Naples.

4. Casts of ancient sculptures, including busts and statues, and reliefs from the Arch of Trajan at Benevento, parts of which have been installed in the new addition to the art gallery.

5. Ancient lamps. The University collection of lamps includes about 300 specimens from Italy, Africa, and Greece, which represent a great variety of types.

6. Several thousand photographic reproductions of masterpieces and remains of Greek and Roman art, including the Brunn-Bruckmann Denkmaeler, and the Brunn-Arndt-Bruckmann Portraits.

7. Engravings, including a complete set of the Piranesi engravings and a number of smaller collections.

Academic Session, 1909-1910

Professor KELSEY:—

Latin Seminary: Lucretius and Greek Philosophy at Rome.

Open to graduate students only.—*Two hours a week, throughout the year.*

Lucretius.

Interpretations and lectures.—*Two hours a week, first semester.*

The Topography and Monuments of the City of Rome.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Roman Art, as studied in the Monuments.

See Courses in CLASSICAL ART AND ARCHAEOLOGY.

Professors KELSEY and DENNISON:—

Cæsar's Gallic War (Teachers' Course, A).

Lectures. Papers prepared by those taking this course. Critical study of the text of the Gallic War, on the basis of Meusel's edition. Studies in the syntax and military antiquities.—*Five hours a week, first semester.*

Virgil (Teachers' Course, B).

Critical studies of the Bucolics, and selected portions of the Georgics, Aeneid, and Appendix Vergiliana, on the basis of Ribbeck's large edition.—*Five hours a week, second semester.*

Professor DENNISON:—

Latin Inscriptions.

Reading of inscriptions of different periods from the De Criscio collection and from reproductions. Interpretation of selected inscriptions.—*Two hours a week, first semester.*

The Letters of Cicero.

Interpretation of selected letters, with a study of Roman manners and political conditions at the end of the Republic.—*Two hours a week, first semester.*

The Letters of Pliny.

Interpretation of selected letters, with a study of Roman literary and social conditions at the end of the first century, A. D.—*Two hours a week, second semester.*

Martial; Petronius, Trimalchio's Banquet.

With special reference to the private and the social life of the Romans.—*Two hours a week, second semester.*

Professor SANDERS and Assistant Professor MEADER:—

Reviews in Roman Literature, Latin Grammar, and Roman Political Institutions.

Systematic reviews, with a direction of the student's reading; intended especially for candidates for the degree of Master of Arts.—*One hour a week, second semester.*

Latin Writing (A).

Attention is given not only to correctness of expression, but also to matters of style and the finer distinctions of the language.—*Two hours a week, first semester.*

Latin Writing (B).

Lectures on Latin style, with collateral reading and written exercises.—*Two hours a week, second semester.*

Courses A and B are usually given in three sections, the students being classified according to their needs and difficulties.

Latin Grammar (A).

Lectures on the phonology and morphology of the Latin language.—*Two hours a week, first semester.*

Latin Grammar (B).

Historical Syntax and Style. Lectures. In this course both the forms and meanings of the more important syntactical types will be treated and special attention will be given to the discussion of the factors (subjective and objective) that condition their development. The continuity of the Graeco-Roman tradition in matters of style will be especially dwelt upon.—*Two hours a week, second semester.*

Professor SANDERS:—

The Sources of the Roman Historians.

Lectures, with direction of work on special themes.—*Two hours a week, second semester.*

Introduction to Latin Palæography.

Lectures on the various styles of writing found in Latin manuscripts, with exercises in reading from facsimiles.—*Two hours a week, first semester.*

Virgil, Georgics.

Interpretations and lectures on the Roman writers on agriculture.—*Two hours, second semester.*

Assistant Professor MEADER:—

The Italic Dialects.

Lectures on the phonology and morphology of the dialects, with the interpretation of selected inscriptions.—*Two hours a week, second semester.*

Latin Comedy.

Selected plays of Plautus and Terence.—*Two hours a week, second semester.*

Summer Session, 1909

Opportunities for graduate work in Latin will be offered during the Summer Session. This work is accepted as a partial fulfillment of the residence requirement for the higher degrees.

Professor KELSEY.**Monumental History of the City of Rome.**

Roman Art, Life and History as illustrated by the monuments, interpreted with particular reference to the light which they throw upon the study of the Roman authors, including the authors read in secondary schools. Lectures, with stereopticon views.

Catullus and Martial.

Interpretation of selected poems, and lectures. Open to graduate students only.

Assistant Professor MEADER.**Latin Language.**

Graduate students will be given direction along special lines of study in the fields of phonology, morphology, semasiology, syntax, and style.

ROMAN LAW AND JURISPRUDENCE**Professor DRAKE:—****History of Roman Law.**

Lectures. A sketch of the development of Roman Private Law, and the relations of Private to Public Law up to the death of Justinian; some account of Roman Law in the Middle Ages, and a discussion of the relations of Roman Law to modern systems of law.—*One hour a week, first semester.*

Roman Provincial Administration.

Lectures. A short account will be given of the geographical extension of Rome through her conquests, of her system of provincial administration, of the effect of provincial development upon the life of the state, of the reorganization of the administration by Augustus and by Diocletian, and a sketch of the later history of the provinces.—*One hour a week, second semester.*

The Development of the Roman Constitution.

Lectures. This course deals with the Roman constitution up to and including the Augustan age. Special attention will be given to the reasons for the failure of the constitution of the Republic, and to the establishment of the Principate by Augustus. Points of resemblance to the American constitution will be noted wherever it may be possible to institute comparison.—*Two hours a week, first semester.*

The Elements of Roman Law.

Lectures and recitations. An outline of the fundamental principles of Roman Law is given in the Institutes of Gaius and of Justinian. Special emphasis will be placed on points of Roman Law which illustrate principles of English Law.—*Two hours a week, second semester.*

The Elements of Spanish Law.

The history of Spanish Law and its relations to Roman Law, with an outline of the most important principles of modern Spanish Law as given in the codes of our recently acquired Spanish possessions.—*Two hours a week, first semester.*

Advanced Course in Roman Law.

A study of selected titles of the Digest of Justinian.—*Two hours a week, second semester.*

The Science of Jurisprudence.

A study of the fundamental principles of positive law.—*Two hours a week, second semester.*

SANSKRIT

The graduate work in Sanskrit is arranged with special reference to the needs of two classes of students: (1) Those who desire to obtain a general acquaintance with the structure of the language on account of the light which the comparative study of Sanskrit throws upon the sounds, inflection and syntax of the ancient and modern languages of Europe. By such students it may be advantageously taken either as a minor subject or as a part of their major study. Such students will use texts printed in Roman characters and thus be required to waste no time in the mastery of a difficult oriental alphabet. (2) Those who wish to obtain a fuller mastery of the language and literature as a preparation for (a) the teaching either of Sanskrit or of General Linguistic and Comparative Philology, for (b) the study of Religion and Comparative Literature, for (c) missionary or other activities in India, of which Sanskrit is the sacred language, spoken by all brahmins.

No announcement of courses of instruction is here made, since the work will in most cases require adjustment to the needs of the individual students.

The work in Sanskrit is conducted by Assistant Professor MEADER.

GENERAL LINGUISTICS AND COMPARATIVE PHILOLOGY

The courses announced below are designed for students of both ancient and modern languages. They aim to familiarize the students with the general principles and methods of the Science of Language, to present the most important facts in the life and growth of language, and to offer an opportunity and direction in original investigations.

Assistant Professor MEADER:—

GENERAL COURSES

Principles of Linguistic Science.

The aim of the course will be to familiarize the student with the general principles and the more important problems of linguistic science. Among the topics discussed are: the relation of the Science of Language to the other humanistic sciences and to the natural sciences; Psychology and the Science of Language; the processes of word-formation and development and loss of inflection; development of syntactical forms; causes and manner of changes in meaning; representative types of language structure, various bases of classification; theories concerning the origin of language.—*Two hours a week, first semester.*

Comparative Philology.

The aim of the course will be the study of the origin and development of the sounds, inflections and syntactical forms of the Indo-European languages. The course will deal with the methods and principles of comparative philology, the chief characteristics of the Indo-European languages, their relationships and classification, the sounds and inflections of the Greek, Latin (French) and Germanic languages, accent and vowel gradation (Ablaut), analogy, comparative syntax, bibliography of comparative philology. Lectures and recitations.—*Two hours a week, second semester.*

SPECIAL COURSES

No courses can here be described in detail, as they must vary with the needs of the students. In general they will be directed toward the intensive study of special problems in the fields of phonology, morphology and semantics (Science of Meanings).

CLASSICAL ART AND ARCHÆOLOGY

The following courses do not require a knowledge of Greek or of Latin. The large collection of lantern slides and photographs owned by the University makes it possible to illustrate all these courses fully. The collection of casts of ancient sculpture in the Art Gallery is also utilized in the courses in ancient art. A more complete statement of the material at hand for the study of Roman Archæology is given under the department of Latin.

Professor D'OUGE:—

Ancient Greek Life. Athens and its Monuments.

Lectures illustrated by means of stereopticon slides.—*Two hours a week, second semester.*

History of Greek Art from the Beginning to the Roman Period.

Lectures and assigned readings on Greek Architecture, Sculpture, Vase-painting, and the minor arts. The course is illustrated with the stereopticon, and occasional lectures are given in the Art Gallery.—*Three hours a week, first semester.*

Professor KELSEY:—

[The Topography and Monuments of the City of Rome.

Lectures, illustrated.—*Three hours a week, second semester.*
Omitted in 1909-1910; to be given in 1910-1911.]

Roman Art as Studied in the Monuments.

Introduction to Roman Archæology; Elements of Roman Architecture; sculpture, painting and the minor arts in the Roman period. Lectures, illustrated with the stereopticon.—*Three hours a week, second semester.*

Professor BONNER:—

Greek Religion.

Illustrated lectures and assigned topics for investigation.—*Two hours a week, second semester.*

Greek and Roman Mythology.

Lectures. Illustrated with the stereopticon.—*One hour a week, second semester.*

SEMITICS AND HELLENISTIC GREEK

The courses in Semitics are intended for:—(1) students who are seeking a liberal culture; (2) students of the classical and modern languages, to furnish them with *necessary* data for the study of the philosophy of language and phonetic laws; (3) students who wish to make a special study of Semitics (the courses leading to the degree of Doctor of Philosophy); (4) students of ancient history; (5) students of art and archæology; (6) students of ethics and theology.

NOTE.—The selections in the linguistic courses offered below may be changed to meet special needs of applicants.

Academic Session, 1909-1910

Professor CRAIG, Dr. FRENCH, and Dr. WORRELL:—

HEBREW***Genesis.**

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

Historical Literature: Judges and I and II Samuel.

Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

Prophetic Literature.

Amos, Hosea, and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

ASSYRIAN**Introduction to Easy Historical Inscriptions.**

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's *Assyrische Lesestücke, vierte Auflage*.—*Three hours a week, first semester.*

Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V).—*Three hours a week, second semester. [1909-1910.]*

Babylonians Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

Religious Literature.

King's "The Prayers of the Lifting-up of the hand." Craig's "Religious Texts."—*Two hours a week, second semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

HISTORY AND ARCHÆOLOGY

Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

Lectures on the History of Israel and Judah.

From earliest times to the Reformation of Ezra.

Lectures. Introduction to the Study of the Old Testament.

Lectures. Study of the Prophetic Books of the Old Testament.

Lectures. The Religion of the Semites.

Lectures. The Wisdom Literature of the Jews and comparisons with similar productions by other peoples.

ARABIC

Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünow's Chrestomathy.—*Two hours a week, second semester.*

Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

ARAMAIC, SYRIAC, ETHIOPIC

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

HELLENISTIC GREEK

New Testament.

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

Septuagint.

Selections from the historical books and the prophets with comparison of the Hebrew and Vulgate Texts. Swete's Edition.

ROMANCE LANGUAGES AND LITERATURE**FRENCH**

The advanced and graduate courses here described presuppose in general three years' previous collegiate study of French. The minimum requirement of undergraduate preparation is represented by courses 1, 2, 3, 4, 5, and 6, described in the University Calendar for 1908-1909.

Academic Session, 1909-1910

Professor CANFIELD:—

[Poetry of the Nineteenth Century.

This course deals with the main aspects of poetry in France from the beginnings of Romanticism to the present time. The chief and representative poets are studied in connection with the currents of thought of the time. Lectures, reading, and discussions. Open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Omitted in 1909-1910.]

The History of the Novel in France.

This course will trace the growth of the novel as a form of literature and its various transformations. A number of representative masterpieces of different periods will be read, and both their technical qualities and their relation to the social and intellectual environments of the time will be studied. Particular attention will be given to the preparation and development of the movement of realism in the nineteenth century. Open to graduates and undergraduates.—*Two hours a week, throughout the year.*

Seminary in French Literature.

The early works of Victor Hugo. Various questions with regard to the sources, structure, style, etc., of these works will be examined.—*Two hours a week, throughout the year.*

Historical French Grammar.

Lectures on Phonology and Morphology, and reading of Old French texts. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor LEVI:—

History of French Literature in the Seventeenth, Eighteenth and Nineteenth Centuries.

A general survey. Lectures, reports, reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Hugo and Balzac.

The art and literary methods of those writers as seen in their novels. Lectures, readings, reports, and discussions. For undergraduates and graduates.—*Two hours a week, throughout the year.*

Professor EFFINGER:—

The Dramatic Literature of the Eighteenth Century.

A study of the dramatic work of LeSage, Marivaux, Crébillon, Voltaire, Diderot, Nivelle de la Chaussée, Beaumarchais and the minor dramatic authors of the time with reference to the evolution of dramatic form. Lectures in French, with assigned readings and reports.—*Two hours a week, first semester.*

The Dramatic Literature of the Nineteenth Century.

The Melodramas of Pixérécourt; the Romantic drama; Scribe; the classical reaction; Dumas fils, Augier, Henri Becque and the modern school. Lectures in French with assigned readings and reports.—*Two hours a week, second semester.*

Assistant Professor THIEME:—

French Versification.

A critical and historical examination of the structure of French verse. Primarily for graduates.—*Two hours a week, first semester.*

Dr. HAMILTON:—

Old French.

Introduction to the Literature of the Old French period, reading of Old French texts. Primarily for graduates. Candidates for this course must be able to read Old French.—*Two hours a week, first semester.*

Beginnings of Modern Literature.

A comparative survey of the literature of the Middle Ages. Primarily for graduates.—*Two hours a week, throughout the year.*

PROVENÇAL

Dr. HAMILTON:—

Outline of the Grammar, with readings in Appel's *Provençalische Chrestomathie*. Primarily for graduates.—*Two hours a week, second semester.*

ITALIAN

The minimum requirement for admission to the courses announced below consists of courses 1 and 2 described in the University Calendar for 1908-1909, or an equivalent.

Professor LEVI:—

Dante: La Vita Nuova and La Divina Commedia.

Lectures on the life and works of Dante with special reference to the interpretation of the Divine Comedy. Recitations and reports on assigned reading. For undergraduates and graduates.—*Two hours a week, throughout the year.*

SPANISH

The minimum requirement for entrance to the advanced courses in Spanish, announced below, consists in courses 1 and 2, and 3 and 3a, described in the University Calendar for 1908-1909, or an equivalent.

Assistant Professor WAGNER:—

The Don Quixote.

In this course the masterpiece of Cervantes will be critically read and the manifold aspects of its significance studied.—*Two hours a week, throughout the year.*

[Lope de Vega and the Classical Drama.

Representative masterpieces of the drama of the seventeenth century will be read and interpreted.—*Two hours a week, throughout the year.*

Omitted in 1908-1909.]

Outline of the History of Spanish Literature.

Lectures intended to accompany the foregoing courses and to offer such a view of the more important movements in Spanish literature that the works studied may be seen in their proper historical perspective.—*One hour a week, throughout the year.*

Old Spanish.

Grammar and reading of texts. Primarily for graduates.—*One hour a week, throughout the year.*

Summer Session, 1909

Graduate students competent to enroll for a higher degree who wish to work in French will be given direction along the lines best suited to their needs. Candidates for graduate work are urged to confer personally or by letter with the instructor in charge of the subject they wish to take up before the beginning of the session.

FRENCH

FOR UNDERGRADUATES AND GRADUATES

Professor LEVI:—

The Novels of Hugo and Balzac.

Lectures, reading, reports and discussions. In this course a number of the principal novels of Hugo and Balzac will be read—entire or in part—and examined with a view to determining the author's art and literary methods.

French Romanticism.

Lectures, readings, reports and discussions. The course will trace the rise, development and decline of French romanticism. More particularly an attempt will be made to examine the principal features of the romantic school in France and account for them historically. A number of masterpieces and extracts will be read and discussed.

Professor EFFINGER:—

Modern French Fiction.

After a brief outline of the early development of French fiction, the modern period will be studied in its various aspects. Among the authors to be considered may be mentioned Hugo, Balzac, Dumas *père*, Flaubert, Zola, Daudet, Theuriet, the Marguerite brothers, Maupassant, Bazin, Barrès, and Anatole France.

PRIMARILY FOR GRADUATES

Professor LEVI:—

Modern French Literature.

Work will be directed, according to the needs of students, in the study of special periods, of the history of special literary forms, as the drama or the novel, or of particular authors, or in the investigation of a special question.

Professor EFFINGER:—

The History of French Fiction.

A course in the history of the development of French fiction. During the summer of 1909, a special study will be made of the fiction of the Nineteenth century.

Assistant Professor THIEME:—

French Poetics.

A study of the principles of French verse structure illustrated by readings from Old French, Classical French, and Modern French poetry.

GERMANIC LANGUAGES AND LITERATURE

GERMAN

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 10, and options in 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8, as described in the University Calendar for 1907-1908, or work equivalent to the courses mentioned.

Courses 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8 are primarily intended for undergraduates, but are recommended to graduates who wish to study the best productions of the German classics.

Academic Session, 1909-1910

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe, affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

History of German Literature.

Lectures and assigned readings. A survey of German literature in its development from the beginnings down to the death of Lessing, with special regard to important epochs, notable literary monuments, and underlying intellectual movements. Vogt und Koch, *Geschichte der deutschen Litteratur von den ältesten Zeiten bis zur Gegenwart*. Robertson, *History of German Literature*. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movements leading to the revolution of 1848. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Proseminary in Schiller.

A comprehensive study of Schiller's life and works with special emphasis upon his philosophical speculations and their influence upon his poetical activity. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Teachers' Courses.

(a) Selected dramas of Schiller, Lessing and Goethe. Lectures, discussions and reports.—*Two hours a week, throughout the year.*

(b) Lectures and discussions on the methods of teaching German and the organization of courses.—*One hour a week, second semester.*

JOURNAL CLUB:—

Current Literature on Germanic Philology.

Meetings of instructors and advanced students in the German department are held once every two or three weeks throughout the year at which reports are made on important contributions to German philology and literature.

Professor DIEKHOF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Reading and interpretation of the *Nibelungenlied*, *Gudrun* and minor epics. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

The Middle High German Court Epic .

Lectures with collateral readings on the characteristic features, composition, legendary setting, language, and metre of the court-epic. Reading and interpretation of *Parzival*. Reports on assigned topics. Primarily for graduates.—*Two hours a week, second semester.*

Introductory Course in Old High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.—*Two hours a week, throughout the year.*

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.—*Two hours a week, throughout the year.*

The History of the German Language.

This course aims to give a systematic presentation of the general development of the German language from the earliest times to the present. A knowledge of Gothic, Old High German and Middle High German is assumed. Primarily for graduates.—*Two hours a week, throughout the year.*

Proseminary in Lessing.

A comprehensive study of the life and works of Lessing. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

[Old Saxon.

Lectures and recitations. Holthausen, *Altsächsisches Elementarbuch*, and Behagel's edition of *Heliand*.—*Two hours a week, throughout the year.*

Omitted in 1908-1909; to be given in 1909-1910.]

Professor HILDNER:—

Proseminary in the Storm and Stress Movement.

Study of the foreign influences and the social and literary conditions of Germany that gave rise to the movement. Investigations in Hamann, Herder, Lavater, Goethe, Lenz, Klinger, Maler Müller, Schiller, Heinse, etc. Reports and discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

Friedrich Hebbel.

A critical study of his leading dramas. Lectures, discussions and reports. Advanced course for undergraduates and graduates.—*Two hours a week, first semester.*

Assistant Professor BOUCKE:—

Heinrich Heine.

A comprehensive study of his life and works. Lectures and reports on assigned topics. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Proseminary in Goethe.

A critical study of the leading works of Goethe. Reports, lectures, discussions. Primarily for graduates.—*Two hours a week, throughout the year.*

The History of German Civilization.

Lectures and readings from Gustav Freytag's *Bilder aus der deutschen Vergangenheit*. This course is intended to supplement the courses in German literature, and gives a survey of the historical development of German culture in its various expressions up to the beginning of this century, with special regard to the more important epochs. Open to undergraduates and graduates.—*Two hours a week, second semester.*

The History of German Literature from 1848-1900.

A general survey of the main literary currents of this period, with special emphasis upon the leading dramatists and novelists and upon the recent naturalistic movement in Germany. Lectures, discussions and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

Assistant Professor FLORER:—

Life and Works of Luther.

Lectures on Luther's influence on the development of the German written language. Discussions of the relation of Luther's teachings to the modern religious movements in Germany. Advanced course open to graduates and undergraduates.—*Two hours a week, first semester.*

Studies in the History of the German Novel.

A comprehensive study of the novels of Goethe, especially of Wilhelm Meister. Lectures on Goethe's influence on the novels of the 19th century. Discussions and reports. Advanced course open to undergraduates and graduates.—*Two hours a week, throughout the year.*

GOTHIC

Assistant Professor EGGERT:—

Introductory Course.

Lectures on phonology and morphology, and reading of the Gospels. Streitberg's *Gotisches Elementarbuch*. This course serves as an introduction to the study of German Philology. Primarily for graduates.—*Two hours a week, first semester.*

Advanced Course.

The Epistles. Heyne's *Ulfilas*, 9te Aufl. Primarily for graduates.—*Two hours a week, second semester.*

SCANDINAVIAN

Dr. HOLLANDER:—

Old Icelandic.

Introductory course. Lectures and reading of selections from the Sagas. Kahle's *altisländisches Elementarbuch*. Primarily for graduates.—*Two hours a week, throughout the year.*

PHONETICS

Assistant Professor EGGERT:—

The Elements of Phonetics.

The study of the elements of speech-sounds, with special reference to the needs of candidates preparing to teach modern languages.—*Two hours a week, first or second semester.*

Summer Session, 1909

The advanced and graduate courses in German, announced below, presuppose a reasonably thorough and extended knowledge of the written and spoken language, and an acquaintance with some of the masterpieces of modern German literature, both of which may be obtained from the undergraduate work not here mentioned. The minimum requirement of undergraduate preparation for the graduate courses consists of Courses 1, 2, 3, 4, 9, 10, and options in 5a, 5b, 5c, 5d, 7, 6a, 6b, 6c, 6d, and 8, as described in the University Calendar for 1907-1908, or work equivalent to the courses mentioned.

GERMAN

Professor WINKLER:—

Goethe's Faust.

Lectures and recitations. Thomas' edition. The drama is studied as a work of art, and the life and thought of Goethe affording a basis for its interpretation, are carefully reviewed and analyzed. An excellent Goethe library, which contains the most important critical material on Faust, affords ample opportunity for special study. Advanced course open to undergraduates and graduates.

Proseminary in Schiller.

A comprehensive study of Schiller's life and works, with special emphasis upon his philosophical speculations and their influence upon his poetical activity. Intended primarily for graduates.

German Romanticism.

Lectures and assigned readings. The beginnings of German Romanticism. Influence of Kant, Fichte, and Schelling upon the Romantic movement. Its relation to German Classicism and to the social and political life of the times. The younger Romantic movement. The period of the wars of liberation. The intellectual and political movement leading to the revolution of 1848. Advanced course open to undergraduates and graduates.

Of the above three courses, the two elected by the larger number of students will be given during the Summer Session.

Professor DIEKHOFF:—

Middle High German.

Lectures and recitations with assigned readings. This course is intended to serve as an introduction to Middle High German; incidentally it includes a brief sketch of the historical development of modern German phonology and inflection. The selections read are drawn from homiletic prose, folk-epic, court-epic, and lyric; and in the translation of these into modern German special attention is paid to the principles underlying change in the word-signification. Paul, *Mittelhochdeutsche Grammatik*, 4te Aufl., and Bachmann, *Mittelhochdeutsches Lesebuch*. Advanced course open to undergraduates and graduates.

Introductory Course in Old*High German.

Lectures based upon Braune's *Abriss der althochdeutschen Lautlehre*, 2te Aufl., and readings from Braune's *Althochdeutsches Lesebuch*, 4te Aufl. The course will include a review of the history of the literature of the period. Primarily for graduates.

German Grammar.

The aim of the course will be to give the student a comprehensive and systematic view of Modern German Grammar. Lectures, discussions, and reports. Advanced course for undergraduates and graduates.

Of the above three courses, the two selected by the larger number of students will be given during the Summer Session.

Assistant Professor BOUCKE:—

Proseminary in Goethe.

A critical study of the principal works of Goethe. Lectures, reports and discussions. Primarily for graduates.

Academic Session, 1909-1910

Professor CRAIG, Dr. FRENCH, and Dr. WORRELL:—

HEBREW***Genesis.**

Baer and Delitzsch's Text. Gesenius' Hebrew Grammar by Kautzch, trans. by Collins, 26th Edition. Craig's Hebrew Word Manual.—*Three hours a week, first semester.*

Historical Literature: Judges and I and II Samuel.

Theile's Biblia Hebraica. Gesenius' Lexicon.—*Three hours a week, second semester.*

Prophetic Literature.

Amos, Hosea, and Isaiah. Study of the nature and content of prophecy in its literary, historical, and ethical aspects. Text-books: Hebrew Bible, Driver's Hebrew Moods and Tenses.—*Two hours a week, first semester.*

Poetical Literature: the Book of Job.

Including study of the literary structure and critique of the dominant ideas. Baer and Delitzsch's Text and Haupt's Polychrome Edition (text by Siegfried).—*Two hours a week, second semester.*

ASSYRIAN**Introduction to Easy Historical Inscriptions.**

From the Ninth Century B. C., with study of the grammar. Text-books: Delitzsch's *Assyrische Lesestücke, vierte Auflage*.—*Three hours a week, first semester.*

Historical Inscriptions.

Selections from the Cuneiform Inscriptions of Western Asia (R. I-V).—*Three hours a week, second semester. [1909-1910.]*

Babylonians Epics:

Stories of Creation, the Deluge, and the War of Marduk against Tiamat, with lectures on the Cosmology of the Babylonians.—*Two hours a week, first semester.*

Religious Literature.

King's "The Prayers of the Lifting-up of the hand." Craig's "Religious Texts."—*Two hours a week, second semester.*

*Candidates for a higher degree who wish to elect a Semitic language as one of the subjects leading to the degree, must have previously completed Courses 1 and 2 in Hebrew, or an equivalent thereto in some Semitic language.

HISTORY AND ARCHÆOLOGY

Lectures on the Ancient Babylonians, Assyrians, Hebrew, Phœnicians.

The lectures are based on the study of the monuments.—*Two hours a week, first semester.*

Lectures on the History of Israel and Judah.

From earliest times to the Reformation of Ezra.

Lectures. Introduction to the Study of the Old Testament.

Lectures. Study of the Prophetic Books of the Old Testament.

Lectures. The Religion of the Semites.

Lectures. The Wisdom Literature of the Jews and comparisons with similar productions by other peoples.

ARABIC

Introductory Course.

Grammar and reading. Socin's Arabic Grammar (English edition) and Brünnow's Chrestomathy.—*Two hours a week, second semester.*

Selected Suras from the Quran.

Chrestomathia Quarani Arabica, Nallino, with introductory lectures on the life of Muhammed and Muhammedanism.—*Two hours a week, first semester.*

ARAMAIC, SYRIAC, ETHIOPIC

Courses in Aramaic, Syriac, Ethiopic are arranged to suit the needs of advanced students.

HELLENISTIC GREEK

New Testament.

a. The Acts of the Apostles, including grammatical study of the peculiarities of Hellenistic Greek, and historical introduction to the book. Text-books: Westcott and Hort's Greek New Testament, revised edition with introduction by Ph. Schaff; Thayer's Winer's New Testament Grammar; Blass' Grammar of New Testament Greek; Thayer's Greek-English Lexicon.—*Two hours a week, first semester.*

b. I Corinthians, II Corinthians, and the study of the Apostolic Age. Grammar and lexicon as in the first semester, and Liddell and Scott's Lexicon.—*Two hours a week, second semester.*

Septuagint.

Selections from the historical books and the prophets with comparison of the Hebrew and Vulgate Texts. Swete's Edition.

week in a general *ex tempore* discussion of the work under consideration. The aim of the course is to lay a foundation for correctly estimating literary masterpieces of varying types. The list of masterpieces is as follows: Spenser's *Faery Queen*; Shakespeare's *Sonnets*; Milton's *Paradise Lost*, and *Paradise Regained*; Dryden's *Absalom and Achitophel*; Pope's *Essay on Man*; Wordsworth's *Prelude*, and *Excursion*; Tennyson's *Maud*, and *Idylls of the King*; Browning's *The Ring and the Book*; Swinburne's *Atalanta in Calydon*.—*Three hours a week, first semester.*

Shakespeare Seminary.

The method is similar to that in the preceding course. The plays selected are: *A Midsummer Night's Dream*; *The Merchant of Venice*; *As You Like It*; *Twelfth Night*; *The Tempest*; *Richard III*; the two parts of *Henry IV*; *Henry V*; *Romeo and Juliet*; *Hamlet*; *Othello*; *King Lear*; *Macbeth*; *Coriolanus*.—*Three hours a week, second semester.*

American Literature Seminary.

Authors studied: Irving, Cooper, Bryant, Emerson, Hawthorne, Longfellow, Whittier, Poe, Holmes, Thoreau, Lowell, Bayard Taylor, Howells, and James. Representative works of the authors named are studied, and an attempt is made to discover the distinctively American element by a comparative study with British authors.—*Three hours a week, second semester.* When this subject is taken for an advanced degree, individual work is assigned for the first semester, upon which the candidate is expected to make weekly reports.

Poetics.

Lectures. Candidates who take their major in English Literature are expected to take this course in connection with the seminary work in English Literature and Shakespeare.—*One hour a week, throughout the year.*

Studies in the Text of Shakespeare.

The aim will be to illustrate the method of textual study as applied to a play like *Hamlet*, and the difficulties to be overcome in establishing a text. The McMillan Shakespeare Library affords a very full apparatus for these studies.—*Throughout the year.*

The Development of the English Novel.

A study of the rise of the novel in England as an art form, with an attempt to discover the principle of its development. Lectures, discussions, and readings in the works of Lyly, Greene, Lodge, Nashe, Sidney, Bunyan, Defoe, Swift, Addison and Steele, Richardson, Fielding, Smollett, Sterne, and others.—*Two hours a week, first semester.*

Prose Fiction of the Nineteenth Century.

Lectures, discussions, and readings in the works of Scott, Austen, Bulwer-Lytton, Disraeli, Dickens, the Brontë sisters, George Eliot, Reade, Trollope, Kingsley, Meredith, Blackmore, Hardy, Stevenson, and others.—*Two hours a week, second semester.*

A Study of Poetic Forms (Epic, Lyric, Drama).

Readings in the works of Tennyson, Arnold, Morris, Rossetti, and Swinburne. Some attention will be given to English metres.—*Three hours a week, second semester.*

Studies in the Poetry of Browning.

Three hours a week, first semester.

Professor STRAUSS and Assistant Professor TILLEY:—

Contemporary Drama.

A brief review of the drama from Sheridan to Bulwer-Lytton will be followed by closer study of the principal Nineteenth Century dramatists, with attention to continental influences. Robertson, Gilbert, Pinero, Jones, Yeats, Philips, and others will be studied and an attempt will be made to discover the present tendencies of the drama. The course presupposes a knowledge of Elizabethan and Seventeenth Century drama, and is open only to those who receive special permission.

Two hours a week, second semester.

Summer Session, 1909

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in English along the lines best suited to their needs. The courses offered below are considered well adapted to the greater number.

Assistant Professor TILLEY:—

Historical English Grammar.

By the study of the principles of historical grammar, of comparative grammar, and of the psychology of speech, modern English grammar is shown to be a living outgrowth of the past stages of the language. This course is designed especially for teachers of English grammar.

Dramatic History and Technique.

With special reference to Shakespeare, his predecessors, and his contemporaries. This course is designed primarily for graduate students working towards a higher degree. Pollard's "English Miracle Plays," Woodbridge's "Drama, its Law and its Technique," TenBrink's "Five Lectures on Shakespeare," Lewis Campbell's "Tragic Drama," and Bradley's "Shakespearean Tragedy," will be found useful books of reference for this course. [For candidates who have already been over this course, the readings and discussions will be varied to meet their needs.]

Professor DEMMON:—

Chaucer.

The aim of this course is to give the students three things, some acquaintance with mediæval life as it is illustrated by the Canterbury Tales, an understanding of the English language of the fourteenth century, and a familiarity with Chaucer and his poetry. A system of pronunciation will be taught approximating to that of the fourteenth century. The Prologue and several of the Tales will be read in class, and some of Chaucer's other works will be assigned for outside reading.

Poetics.

A study of poetic forms (Epic, Lyric, Drama) as illustrated in the works of Tennyson, Arnold, Morris, Rossetti, and Swinburne. Introduction to the study of English metres.

Professor STRAUSS:—

Studies in the Poetry of Browning.

RHETORIC

The advanced and graduate courses described below presuppose an acquaintance with the fundamental principles of rhetoric and a reasonable proficiency in the technique of prose. The study of composition, except where it is pursued with reference to the theory of teaching, is regarded as an undergraduate study.

Academic Session, 1909-1910

Professor SCOTT:—

Interpretations of Literature and Art.

The first weeks of the course are given to a discussion of the leading principles of criticism. These principles are then applied in the appreciation and interpretation of specimens of literature and art. The course is conducted as a seminary.—*Two hours a week, first semester.*

Newspaper Writing: Theory and Practice.

Intended for students who are preparing to do newspaper work. The class will prepare and publish, in the course of the semester, several issues of a daily paper.—*Two hours a week, first semester.*

Seminary in Advanced Composition.

This course is intended for a limited number of advanced students who write with facility and are in the habit of writing, but who desire personal criticism and direction. Although the greater part of the time will be spent in the discussion of the manuscripts submitted for correction, there will be talks upon the essentials of English Composition and the principles of criticism and revision. Open only to students who receive special permission.—*Two hours a week, throughout the year.*

Prose Fiction.

Studies in the structure and function of the leading types of prose fiction, including the short story.—*Two hours a week, second semester.*

Teachers' Course. Methods of Teaching English Composition and Rhetoric.

The course includes an outline of the principles of rhetoric and a discussion of the chief problems of composition teaching.—*One hour a week, second semester.*

Seminary in Rhetoric and Criticism.

The subjects of discussion vary from year to year. Among the problems to be investigated are the following: The origins of prose; the nature and origin of the leading types of discourse; the psychology of figures of speech; the rhythm of prose; the sociological basis of the principles of usage. In 1909-1910 a study is made of the origin, development and laws of the process of communication.—*Two hours a week, throughout the year.*

Assistant Professor THOMAS:—

Studies in the Theory of Style.

Analysis will be made of some of the most noted essays on style by authors representing the various points of view from which the subject has been considered. Among others, De Quincey, Spencer, Pater, and Stevenson will be taken up. This course will be conducted as a seminary.—*Two hours a week, second semester.*

Short Story Writing.

Analytic studies in the technique of the short story will be accompanied by constructive work in story writing.—*Two hours a week, second semester.*

Summer Session, 1909

Assistant Professor THOMAS:—

The Theory and Practice of Argumentation.

A study of the principles which underlie argument. Special attention will be paid to the brief, and the relative value of various forms of proof. This course is intended for those who desire special training for the teaching of argumentation.

Advanced Studies in Rhetorical Theory.

A study of the province and interrelation of the type-forms of discourse; description, narration, exposition, and argument. Special problems in the function and structure of each type will be outlined for individual investigation. Each student will be expected to choose some topic for special study.

ORATORY

Academic Session, 1909-1910

Professor TRUEBLOOD:—

Study of Great Orators.

Lectures on methods of public address and sources of power. Study of representative orations. Structure of the oration. Qualities of a good oration. Brief making. The preparation and delivery of speeches. Those who desire at some time to enter the public debating contests should take this course.—*Two hours a week, first semester.*

Debating.

Study and application of the principles of argumentation. Preparation of briefs. Leading questions of the day studied and debated in class. The aim is to develop readiness in extempore speaking, to give freedom and ease on the platform, and to cultivate the logical processes of analysis and discrimination. All who expect to enter the debating contests or who expect to teach argumentation should take this course.—*Two hours a week, throughout the year.*

Shakespearean Reading.

Critical study of four plays, two tragedies and two comedies. Analysis of character, plot and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes presented from the platform. Public recitals twice each semester. Plays to be selected.—*Two hours a week, throughout the year.*

Professor TRUEBLOOD and Mr. HOLLISTER:—

Advanced Public Speaking.

Examination of the Webster-Hayne, the Lincoln-Douglas and other great debates. Briefing of a public question, and the preparation and delivery by each student of an extended address. Participation in the public debating or oratorical contest of the semester required, or the presentation of an equivalent amount of practical speaking before public assemblies.—*Two hours a week, second semester.*

Mr. HOLLISTER:—

Forensic Masterpieces.

This course is designed to cultivate an appreciation of the oratory of a few leading English-speaking orators, and to develop expressive reading and speaking. A critical study of the principal speeches of five or six great orators, and delivery from the platform of extracts from those speeches. Selections made from the following: Hamilton, Webster, Phillips, Lincoln, Beecher, Chatham, Burke, Erskine, Bright, and Gladstone.

Summer Session, 1909

Professor TRUEBLOOD:—

Debating.

Study and application of the principles of argumentation. Preparation of briefs. Leading questions of the day studied and debated in class. The aim is to develop readiness in extempore speaking, to give freedom and ease on the platform, and to cultivate the logical processes of analysis and discrimination. All who expect to enter the debating contests or who expect to teach argumentation should take this course.

Shakespearean Reading.

Critical study of four plays, two tragedies and two comedies. Analysis of character, plot and incident. Expressional reading of principal scenes. Characters assigned to members of the class and scenes presented from the platform. Public recitals. Plays to be selected.

MUSIC

In addition to the undergraduate courses in choral music, harmony, history of music, musical analysis, counterpoint, etc., special courses are provided for graduate students.

These courses are divided into two groups. The first group, simple and double counterpoint, canon and fugue, free composition and instrumentation, is intended for such students as have the proper preliminary training, and possess the special talent necessary for creative work. The second group represents original research in the history of music, criticism of the literature of music, or research work in the evolution of musical instruments. The successful prosecution of work in these courses demands the same preliminary training as the studies in the first group, and for the last named course a thorough scientific preparation.

Attention is called to the fact that the opportunities for hearing music, without which work of a critical nature is difficult, if not impossible, are exceptional; while the Stearns Collection of Musical Instruments, including representatives of all classes of instruments (nearly sixteen hundred in number), furnishes ample material for research. The special library on this subject is already of considerable importance, and additions are being constantly made of the most important works bearing on this, and the other subjects, indicated as proper for graduate work. While simple counterpoint is included in undergraduate work, it is desirable that students pursuing graduate work in the first group should have mastered it, although it is not demanded as a condition of entrance upon the work.

Academic Session, 1909-1910

Professor STANLEY:—

FIRST GROUP

Simple Counterpoint.

Two hours a week, throughout the year.

(Only in exceptional cases will this be regarded as graduate work.)

Double Counterpoint.

Two hours a week, throughout the year.

Canon and Fugue.

Two hours a week, throughout the year.

Free Composition, and Instrumentation.

Two hours a week, throughout the year.

SECOND GROUP

Historical Research.

Two hours a week, throughout the year.

Musical Criticism.

Two hours a week, throughout the year.

(This is not to be confounded with the more general course given to undergraduates, as this involves special research, and careful analysis of the principles of criticism as applied to music and its literature.)

Research in the Evolution of Musical Instruments.

Time to be arranged.

Original work in research will be required of candidates for the doctor's degree, who take music as one of their subjects. The scope of this work will depend upon the importance of the subject, i. e., whether a major or minor. If music is a major, the general conditions respecting a thesis must be complied with; if a minor, the amount of work required will be determined by the committee in charge.

HISTORY**Academic Session, 1909-1910**

Professor HUDSON :—

The History of Europe since the Treaty of Westphalia.

This period is covered in two courses, each *three hours a week*. The course given the first semester deals mainly with the condition of society and government on the eve of the Revolution, and with the Revolutionary and Napoleonic era, as marking the transition between the old and the new political and social order. In the course given the second semester, the emphasis is laid upon the national movement of the nineteenth century, and a careful study is made of the establishment of Italian and German unity and of the work of Cavour and of Bismarck.

Professor Dow :—

Medieval Civilization and the Rise of Modern States.

In this work a study is made of the institutions and life of the middle ages, with special reference to the principal problems encountered and the principal measures taken toward the building of those states through which western Europe was ruled by the end of the fifteenth century.—*Lectures, reading, and discussions; three hours per week, during the first semester.*

The Age of the Renaissance and the Reformation.

In this work a study is made of the civilization and history of Europe in the later middle ages and sixteenth century, with special reference to the Reformation,—its many-sided background and environment, and certain features of its progress and outcome.—*Lectures, reading, and discussions; three hours per week, during the second semester.*

Introductory Historical Seminary.

An orderly survey is made of the various sorts of work done toward the writing of truthful history, and exercises are conducted to give some practical acquaintance with the principal methods and tools employed in the study of history.—*Two hours per week, throughout the year.*

Seminary in Medieval History.

In this work the members of the Seminary coöperate with the instructor in the study of some subject from the sources. The subject chosen usually belongs to the period of the later middle ages or early modern times.—*Two hours per week, throughout the year.*

Professor CROSS:—

Studies in English History since the Reformation.

The period covered by this work extends from the Reformation to the Revolution of 1688 inclusive. Three successive phases of the subject are dealt with in courses given in different years. The first course, which is primarily concerned with the separation from Rome under Henry VIII., and the completion of the Reformation settlement under Elizabeth, takes into account the characteristics of Tudor absolutism, foreign relations, and intellectual, social, and industrial conditions, so far as they touch the main problem. The second course is devoted to the Puritan Revolution. Beginning with the situation at the accession of the Stuart dynasty the relations between the Crown, Parliament, and the Nation up to the outbreak of the Civil War will be traced to detail. In the concluding course of the cycle the nature and meaning of the Restoration, with particular reference to Parliament and the Church, are first examined. Among the remaining topics treated are: The home and foreign policy of Charles II and James II, the causes leading to the expulsion of the latter monarch, the various steps in constitutional development, the attempts to secure toleration for Dissenters, and the course of political thought to 1689.

Following introductory lectures by the instructor on the general features and the sources and literature of the period to be studied, the bulk of the work will consist of discussions and reports by the students on assigned topics, with a view to afford training in critical and constructive use of standard histories, monographs, and original documents.

The course for 1909-1910 deals with the Reformation.—*Two hours a week, throughout the year.*

Summer Session, 1909

Professor Dow:—

The Later Middle Ages and the Reformation.

This course is designed for students who already have some knowledge of general European history. The work will consist of studies of the history of Europe from the thirteenth to the middle of the sixteenth century, with reference primarily to the many-sided environment of the Reformation. Lectures, reading, reports, and discussions.

Introductory Historical Seminary.

In this course an orderly survey will be made of the various sorts of work done toward the writing of truthful history, and exercises will be conducted to give some practical acquaintance with the principal methods and tools employed by serious students of history.

Professor Cross:—

General History of England.

From the accession of Henry VII. to the Puritan Revolution. This course, beginning with the foundation of the Tudor absolutism, deals in broad outline with the English Renaissance, the Reformation and Counter-Reformation, the policy and work of Elizabeth, and the conflict between the Crown and Parliament under James I. and Charles I., culminating in the Puritan Revolution. Social, industrial, and intellectual conditions are considered in connection with the political and constitutional history. Some attention is paid to bibliography. There will be three lectures and one oral quiz a week, and collateral reading and written work may be required.

GOVERNMENT**Academic Session, 1909-1910****Professor FAIRLIE:—****National Administration of the United States.**

This course is a study of the United States national government in action. It begins with a brief analysis of the federal system, the organization and procedure of Congress and the special executive powers of the Senate. This is followed by a study of the legislative and administrative powers of the President, the cabinet and each of the executive departments and their various administrative services, such as the diplomatic and consular service, revenue administration, the postoffice, etc. The Civil Service Commission and the development of its work will be discussed with reference to the means and opportunities of entering the administrative service. A brief survey will also be given of the organization and jurisdiction of the national judiciary in the United States.—*Three hours a week, first semester.*

State and Local Administration.

In this course will be given a general and comparative survey of government in the different states of the American Union. Some time will be given to the development of constitutions. Each of the three departments of State government will then be examined: the legislatures, the judiciary, and the governors and other State officers and institutions. Local government, including county, township and municipal administration, will be studied. And the organization of political parties, and their influence on the workings of the governmental machinery, will be briefly discussed.—*Three hours a week, second semester.*

The Government of Michigan.

After tracing constitutional and political development in Michigan, the various organs of State and local government in this State are studied in turn: the legislature, the judicial system, the governor, and other State officers and institutions, and local administration in the counties, townships, and cities. Election methods will also be examined in the light of the new legislation on primaries. The new State Constitution will be used as the basis for study; but this will be explained and interpreted by statutes, judicial decisions, and governmental practice.—*Two hours a week, second semester.*

English Political Institutions.

While dealing primarily with present institutions, this course will necessarily treat of their development, especially during the nineteenth century. Among the topics considered will be: the supremacy of Parliament, the democratization and dominance of the House of Commons, the system of cabinet government, the influence of the Crown and the House of Lords, the party system, election methods and parliamentary procedure. A brief outline will also be given of the judicial system, local government, and the system of colonial government.—*Three hours a week, first semester.*

Comparative Administration.

Two courses dealing with national and local administration will be offered in alternate years. In the former a study will be made of the various branches of national administration in the principal European countries in comparison with the corresponding services in the United States. In the second course a similar comparison will be made of American and European local government. Special attention will be given to local administration in the United States and England, showing in the latter country the changes during the nineteenth century from the former aristocratic and decentralized methods to the present democratic régime under administrative control by the central government. With this will be compared the highly centralized French system of local administration, the less centralized but more bureaucratic administration in Prussia, and the system of special administrative courts in both countries. The study naturally discloses striking points of difference from American arrangements, and suggests discussion as to the relative merits of the different methods.—*Two hours a week, second semester.*

Municipal Administration.

Two connected courses are given on this subject, running throughout the year. That given the first semester deals with municipal development and the functions of municipal government. The historical part considers briefly ancient and medieval cities, and more at length English, American and nineteenth century development. The discussion of municipal activities includes the various services, such as the police, fire brigades, health departments, schools, charities, public works, municipal lighting and street railways; and in each field there is a study of development, present conditions and methods of administration in the leading cities of Europe and America, with a discussion of disputed problems, such as the control of the police and municipal ownership.

In the second semester course, a study is made of municipal organization, methods of central control and local politics. This begins with a study of municipal organization in the United States, including the recent tendencies to centralize power in the hands of the mayor. With the American methods are compared the English system of government by council and the systems of France and Prussia. This is followed by a study of legislative, judicial and administrative control over municipal officials in the various countries. The last part of the course deals with political parties in cities, recent legislation concerning primaries, municipal reform movements and organizations, and the relation of politics to municipal administration.—*Three hours a week, throughout the year.*

Political Parties.

A study of the development of parties and party organization in Great Britain and the United States, of the present system of party machinery in these countries and its influence on the government, and of recent and proposed political reforms, including legislation on party primaries. Lectures and readings in Ostrogorski's *Democracy and the Organization of Political Parties*, Woodburn's *Political Parties*, Macy's *Party Organization* and other books.—*Two hours a week, one semester.*

Seminary in Administration.

These are courses for original research on special topics, in national, state or local administration. Special arrangements made with qualified students.—*Two hours a week, each semester.*

See also Courses in ROMAN LAW AND JURISPRUDENCE, page —.

Additional advanced courses in Public Law are offered in the Law Department, viz.: Constitutional Law, Public Officers, Taxation, Public Corporations, and the Science of Jurisprudence.

AMERICAN HISTORY

All of the courses in American history may be of interest to graduate students. This will depend on the amount of undergraduate work they have done and the nature of their previous study. The general plan of work includes the following group of courses which covers the several fields of American history and culminates in a seminary devoted to original research. A teacher's course, which is not mentioned below, is given the second semester. It consists chiefly of practical talks to those intending to teach, on the purposes and methods of historical instruction, and gives useful information concerning bibliography and other aids used by the secondary teacher.

Academic Session, 1909-1910

Professor VAN TYNE:—

Seminary in American History.

This course is primarily for graduate students who have already done considerable historical work. The object is to give training in the investigation of historical problems, in the handling of original material, and in the proper presentation of reports. Graduate students will receive individual attention and assistance in the prosecution of their investigations.—*Two hours a week, throughout the year.*

Constitutional and Political History of the United States, 1775-1861.

In this course lectures are given twice a week. Once a week the class is divided into sections for the purpose of discussing informally the topics presented in the lecture, and to enable students to make reports on collateral reading and other assigned tasks. The purpose of the lectures is not to give a symmetrical narrative account of the history of the United States, but to treat somewhat carefully the more significant constitutional problems, to interpret signal movements, to point out the bearings and relationships of facts. An effort is also made to trace the political and social development of the country.—*Three times a week, throughout the year.*

Professor PAXSON:—

American Colonial History.

The purpose of this course is to trace the development of our early history as far as the Revolution. The lectures are intended to emphasize the more important phases, to interpret facts, and to show their relations. Some attention is given to the period of discovery, the cartography, and to the plans and characteristics of colonizing nations. Chief emphasis is laid on the development of the social, industrial, and political life of the English colonies, and to the growth of American institutions and principles.—*Three times a week, second semester.*

United States History from the Beginning of the Civil War (1860) to the Present Time.

In addition to the political and constitutional questions of the war and reconstruction periods, the lectures will deal with the social and economic conditions existing in the North and the South, both during those periods and after. The race question,

the "Solid South," the industrial expansion, and the evolution of the United States into a world power will be treated. The lectures will be amplified by assigned reading and informal discussions.—*Three times a week, throughout the year.*

Studies in American History.

This course is intended to give opportunity for the somewhat careful study of selected topics in American history. Important social, economic, diplomatic and political problems not fully treated in the regular lecture courses are chiefly selected for treatment. Oral reports are prepared under the direction of the instructor. Special facilities are given for the use of the library.—*Two hours a week, throughout the year.*

Constitutional Law and Political Institutions of the United States.

This course consists of a series of intensive studies in the leading principles of Constitutional Law, with especial reference to the distribution of powers among the departments of the federal government and between the federal government and the states. The work is based upon a study of leading cases.—*Three times a week, first semester.*

Summer Session, 1909

Professor VAN TYNE:—

Seminary in American History.

This course will be given, as announced for the academic session. It will be devoted to a study of certain problems in the Civil War period.

Professor SIOUSSAT:—

American Colonial History.

This course covers the same ground as the course announced above.

The American Revolution and the Federalist Régime.

This course covers the first half of course in Constitutional and Political history of the United States.

INTERNATIONAL LAW

The courses in international law presuppose a general acquaintance with modern European history.

Academic Session, 1909-1910

President ANGELL:—

Lectures on International Law.

Two hours a week, first semester.

History of Treaties.

Two hours a week, second semester.

POLITICAL ECONOMY, SOCIOLOGY, INDUSTRY AND COMMERCE

The strictly undergraduate courses in political economy represent the work of at least one academic year. These courses cover "Elements of Political Economy" and "Problems in Political Economy." For descriptions see the University Calendar.

The courses enumerated below are, with two or three exceptions, open to undergraduates as well as graduate students, but special instruction will be afforded all graduate students in connection with these courses, this special instruction being devoted to a more careful analysis and a more extended discussion than is possible in the lectures. The courses designated as Graduate Courses are open only to graduate students, or to undergraduates making a specialty of political economy in their senior year.

Attention is called to the fact that the development of the Special Courses in Higher Commercial Education offers unusual advantages for those who desire to prepare themselves for teaching commercial subjects in colleges and high schools. It may be stated further that students who intend to study for the ministry, as also those who desire to prepare themselves for residence in social settlements or work in connection with municipal charity organizations, may with advantage combine the courses offered in sociology and political economy with courses offered in other departments of the University.

A number of advanced courses in transportation are in contemplation and will probably be ready for announcement before the opening of the college year. Definite information concerning them may be secured by consulting the Announcement of the Department of Literature, Science, and the Arts, or the special announcement of courses in commerce.

Academic Session, 1909-1910**POLITICAL ECONOMY**

Professor ADAMS:—

History of the Development of Industrial Society.

This course embraces a history of English industrial society from the twelfth century to the present time, and is designed to show how modern industrial customs and rights came into existence. It should be preceded by a course in English History.—*Three hours a week, second semester.*

Seminary in Political Economy.

It is the purpose of instruction upon the seminary method to familiarize the student with independent investigation. For the first semester the seminary will investigate special problems in transportation; for the second semester special problems in social reform.—*Two hours a week, both semesters.*

Professor TAYLOR:—

Principles of Finance.

In this connection the word finance is used in the technical rather than the popular sense. That is, it does not include money, banking, stock speculation, or any of the allied topics, but is rather concerned with those operations which are involved in meeting the expenses of governments. It begins with an account of expenditures,—their different kinds, the limits as to amount set by financial considerations, and so on. It then treats the various methods of raising funds to meet these expenditures, giving to taxation, as the most important, the fullest treatment. Finally, it explains the principal features of the legislative and administrative procedure whereby the raising of revenue and the making of expenditure are carried out.—*Three hours a week, second semester.*

Theory and History of Money.

This course begins with a descriptive account of the media of exchange, including money and its various credit substitutes. This is followed by a study of the natural laws governing monetary phenomena, such as those which fix the monetary standard, those regulating the movement and distribution of money, and so on. Next comes a sketch of monetary history,—particularly that of the United States. Finally, three or four lectures are given to the best methods of regulating monetary systems.—*Two hours a week, second semester.*

Banking.

This course is roughly divided into three parts. The first is chiefly descriptive, being occupied with a fairly full account of banking instruments and operation. This is followed by a study of banking theory, the volume of loan resources available to a bank, and so on. The last weeks of the course are given to the history of the most important banking systems, especial stress being laid on those which now exist, or have existed, in the United States.—*Two hours a week, second semester.*

Economic Theory. Advanced Course.

The time of this course is usually given to a comparative study of the history of opinion on the leading problems of economic theory,—the nature of capital, the origin of interest, the laws of value, and so on. The work of the class hour includes the discussion of readings assigned to particular members. The topics covered vary from year to year. When a particular group of students remain together for two or three years, this and the following course are developed into a series of courses, covering new ground each year. Further, the instructor reserves the right to change altogether the character of the course, if the needs of the students interested seem to require it. For example, this course is sometimes devoted to a general review of economic theory.—*Two hours a week, first semester.*

History of Political Economy.

This course is intended for students who are specializing in Political Economy, and is open only to such as have already taken considerable work in the subject. Some text-book—Ingram or Cossa—is made the basis of the work; but in dealing with the more important writers, such as Adam Smith, Ricardo, and Mill, much of the time is given to the direct study of their writings. The instructor reserves the right to change entirely the character of this course, if the interests of the students who would naturally elect it seem to make such a change desirable. See also under preceding course.—*Two hours a week, second semester.*

Assistant Professor SMALLEY:—

General Economies.

This course is designed to give a general view of political economy, and is intended for students whose primary interest is in other subjects, but who wish to gain some acquaintance with economic principles and problems. It is open to graduates and to seniors. Others who desire to study political economy are expected to elect at the outset Course 1, and will be admitted to this course only by special permission, in exceptional cases.—*Three hours a week, second semester.*

Corporations.

This course undertakes a study of corporations as an element in industrial society. It deals, first, with the nature and history of corporations, and their significance in modern life. It then offers an account of the promotion, capitalization, management, dissolution, and reorganization of corporations,—a discussion designed especially to disclose the evils to which the growth of corporations has given rise. The course concludes with a consideration of various remedies for these evils, including public control of corporations, special attention being given to the proposal of federal incorporations.—*Three hours a week, first semester.*

Transportation Problems.

This course considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country, describes the principal types of railway abuses, discusses the progress of state and national regulation, and the problems involved therein, considers the advantages and disadvantages of government ownership, and pays some attention to the railway situation in the principal European countries.—*Three hours a week, second semester.*

Government Control of Industry.

The aim of this course is to consider industrial regulation from the legal point of view. A study is made of the power of government, under our constitutional system, to control industrial action. This involves, in the main, a discussion of the legal doctrines of the police power and of public policy, as far as they are of economic importance, special attention being paid to their bearing upon the solution of the problems of labor and capital, trusts, railroads, and so forth.—*Two hours a week, first semester.*

SOCIOLOGY

Professor COOLEY:—

Principles of Sociology.

This course aims at a systematic and comprehensive study of the underlying principles of social science. The general plan followed is to begin with personal relations in their simplest and most direct form; proceeding thence to the more complex forms of association, to an analysis of the process of social change, and, finally, to a study of social tendency and the theory of progress. Cooley's "Human Nature and the Social Order" and "Social Organization" are used. Historical references are employed, but the main aim is a rational interpretation of existing society, and

ample contemporary illustration is given of the principles advanced. While some attention is paid to the differing views of prominent writers, the course is, in the main, constructive rather than critical. A thesis is required.—*Four hours a week, first semester.*

Problems in Sociology.

This course embraces a study of the laws of population, degeneracy, the liquor problem, poor-relief (public and private), vagrancy, crime, and penology, the divorce problem and kindred questions, the assimilation of the foreign element in American population, the development of cities, the tenement question, slums, social settlements, and other sociological questions of present interest.

The class is supplied with a list of about fifty topics, accompanied by references, and each student is required to choose one of these topics and write an essay upon it.—*Four hours a week, second semester.*

The Development of Sociological Thought; Study of Comte, Spencer, Ward, Giddings, and Others.

This course is intended to furnish an opportunity for comparative study and discussion of the writers who have contributed most to the growth of sociology. The choice of topics, however, depends much upon the individual capacity and preference of the students. The class consists chiefly of graduate students, and is conducted as a seminary.—*Two hours a week, first semester.*

Psychological Sociology.

This course is similar in character to the preceding, and usually, though not necessarily, succeeds it. It is conducted as a seminary.—*Two hours a week, second semester.*

The Social Development of the Church.

This course is designed to give students intending to enter the ministry, or others especially interested in the church, an opportunity for study and discussion of the relation of the church to the rest of society both in the past and at the present time. It must be preceded by Course 19, and is conducted somewhat as a seminary.—*One hour a week, throughout the year.*

Special Work With Graduate Students.

Graduate students sufficiently advanced in their work to need special guidance,—especially those working for the doctor's degree,—will be met in small groups or singly, as often as it is found practicable and expedient.—*First and second semesters.*

INDUSTRY AND COMMERCE

Professor JONES:—

The Resources and Extractive Industries of the United States.

The first part of the semester is occupied with a study of the physical and social resources of the United States.

The latter part is occupied with studies in the industries connected with American agriculture, forestry, and mining.—*Three hours a week, first semester.*

The Manufactures of the United States.

The problems arising in connection with the organization and management of manufacturing establishments are studied by means of required readings and class exercises. This work is supplemented by lectures upon the iron and steel industries.—*Three hours a week, second semester.*

The Distributive Industries of the United States.

Lectures and assigned readings. The group of courses bearing the above title has for its general purpose to give an account of the methods employed in marketing economic goods, to describe the agencies used, and to define the work of those classes, which are engaged in producing time, place, and quantity utility.

a. **History of Internal Commerce in the United States.**

Two hours a week, second semester.

b. **The Distribution of Agricultural Products.**

Two hours a week, first semester.

c. **The Manufacturer's Problem of Distribution.**

Two hours a week, first semester.

d. **Wholesale and Retail Trade.**

Two hours a week, second semester.

Professor GLOVER:—

Mathematics of Insurance.

In connection with the course in Higher Commercial Education, six courses are offered upon the actuarial phases and technique of insurance. The theory of the valuation of securities is also presented. For students in this line a statistical laboratory equipped with all necessary computing machines is available. For further information regarding courses in insurance, see this Announcement under Mathematics.

A course of lectures on Insurance Law given in the Law Department is open to students in the Department of Literature, Science, and the Arts by special arrangement.

Summer Session, 1909**ECONOMICS**

Professor TAYLOR:—

Money and Banking.

Text-book and lectures. The time of this course will be divided between Money and Banking in about the ratio of 2 to 1. The work in each subject will include both theory and history. On the historic side the experience of our own country will naturally receive most attention. The student will need Taylor's Chapters on Money.

Assistant Professor SMALLEY:—

Corporations.

This course will be similar in character to the course given under the same title in the regular session.

Government Control of Industry.

This course will be similar in character to the course given under the same title in the regular session.

Studies in Economics.

This course is intended for graduates and advanced students. The subjects to be studied will be selected to meet the needs of those who elect the course.

SOCIOLOGY

Professor COOLEY:—

Principles of Sociology: Social Organization.

This course aims at a systematic study of the underlying principles of social science. It includes about one-half of the matter offered in Course 19 of the academic session; and the plan is to give the other half in a subsequent Summer Session. Thus, students may elect Principles of Sociology for two years and get an equivalent to what is offered in the academic session. Lectures and text-book. In addition to the above, if demanded, special work may be arranged.

PHILOSOPHY

The advanced courses prescribed below presuppose instruction in logic, ethics and general psychology; also a general introduction to philosophy, and a somewhat extended study of the history of philosophy, ancient, medieval and modern. Candidates who have not had preparation equivalent to this are expected to take certain

of the lower courses, particularly those described as "second courses" in the Literary Announcement, either before entering upon, or in connection with, their graduate work. Advanced courses bearing upon the history of philosophy and its present problems are also given in the departments of Greek, Latin, French, German, and Semitics. The courses in mathematics are also a most valuable preparation for philosophical study.

For the provisions in regard to the fellowship in philosophy, see page 35.

Academic Session, 1909-1910

A. SEMINARIES

Students who have attained the necessary advancement in special lines of study will be assigned, for the most difficult work, to the various professors of the department as follows:

Metaphysics, Professors WENLEY and LLOYD, Mr. VIBBERT and Dr. EMERSON.

History of Philosophy, Professor LLOYD, Mr. VIBBERT.

Ethics, Professors WENLEY and LLOYD, Mr. VIBBERT and Dr. EMERSON.

Modern Systems, Professors WENLEY and LLOYD, Mr. VIBBERT and Dr. EMERSON.

Ancient Philosophy, Professors WENLEY and REBEC, and Mr. VIBBERT.

Philosophy of Religion, Professor WENLEY.

Aesthetics, Professor REBEC.

Political Philosophy, Professor LLOYD.

Epistemology, Professor LLOYD, Mr. VIBBERT and Dr. EMERSON.

Logic, Professor REBEC and Mr. VIBBERT.

Psychology, Rational, Experimental and Pathological, Professors PILLSBURY and BARRETT, Dr. SHEPARD.

The library of George S. Morris, late Professor of Philosophy in the University, has been given to the Philosophical Department. It contains about 1,100 volumes, covering the entire field of philosophical inquiry. These have been shelved in the Morris Seminary Room, and are reserved for the exclusive use of graduates and special students in Philosophy.

B. HISTORY OF PHILOSOPHY

Professor WENLEY:—

*The Philosophy of Kant.

Proseminary; study of the Critique of Pure Reason.—*Two hours a week, first semester.*

*The Philosophy of Hegel.

Study of the Logic and discussions.—*Two hours a week, second semester.*

Mr. VIBBERT:—

*Contemporary Philosophy.

Two hours a week, first semester.

Professor REBEC:—

*American Ideas.

Origin and development of the ideas that have underlain American life and history, and come to expression in American literature, theology, and speculative movements. Lectures and reports.—*Two hours a week, first semester.*

C. ETHICS

Mr. VIBBERT:—

*Aristotle's Ethics.

Collateral reading and theses.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

D. PSYCHOLOGY

The Psychological Laboratory is well equipped for original investigation; and its facilities have been recently improved by removal to new quarters. See page 28.

Professors PILLSBURY and BARRETT, Dr. SHEPARD:—

Original Investigation.

Hours as may be assigned, throughout the year.

Professor PILLSBURY:—

Apperception.

Two hours a week, first semester.

Psychology of the Abnormal and Occult.

Two hours a week, first semester.

Genetic Psychology.

Two hours a week, second semester.

Dr. SHEPARD:—

Psycho-Physical Methods.

Two hours a week, second semester.

E. SPECIAL COURSES

Professor WENLEY:—

*Movements of Thought in the Nineteenth Century.

A study of the metaphysical implications of modern thought. Lectures, reading, thesis.—*Two hours a week, second semester.*

Professor LLOYD:—***Philosophy since Hegel.**

The object of this course is to introduce the student to the methods of investigation and discussion in the subject. Lectures; detailed study of Lotze, the Pessimists, etc.—*Two hours a week, second semester.*

Professor LLOYD:—**Political Philosophy.**

A critical study of society, of sovereignty, rights, duty, and of the idea of the social organism.—*Two hours a week, first semester.*

Theory of Knowledge.

Special attention in 1909-1910 to the question of the possibilities of a realistic expression.—*Two hours a week, throughout the year.*

Metaphysics.

A study of fundamental problems in philosophy, with special attention in 1909-1910 to the philosophy of evolution.—*Two hours a week, second semester.*

*Starred courses should not be elected without consultation.

Professor REBEC:—**Æsthetics.**

Lectures, reports, theses.—*Two hours a week, first semester.*

Evolution of the æsthetic consciousness, as revealed in the typical great masterpieces of literature. Lectures and essays.—*Two hours a week, second semester.*

Philosophy of Discourse.

Two hours a week, second semester.

Dr. EMERSON:—**Pragmatism.**

Two hours a week, first semester.

Summer Session, 1909**Professor WENLEY:—****Æsthetics.**

This course will deal mainly with the Aesthetics of nineteenth-century Idealism. The philosophical development will be considered, and illustrated by reference to the English poets and prose writers representative of the movement. Graduate

students who have worked under Professor REBEC's direction, and who propose to continue during the Session, will please communicate with Professor WENLEY in advance, or immediately upon arrival, and, in either case, come prepared with a detailed statement of work done.

Professor PILLSBURY and Assistant:—

Experimental Psychology.

For graduates and undergraduates. An introduction to experimental methods, with the repetition of classical experiments. Special emphasis will be placed on methods that can be applied in school practice. The work will be adapted to suit the needs and attainments of the individual student.

Professor LLOYD:—

Seminary in History of Philosophy and Ethics.

In 1909, the work of this Seminary will probably be confined to studies in the history of ancient philosophy. However, students wishing to work in other periods, or to pursue special studies in Ethics or political philosophy, should consult the instructor. So far as possible arrangements will be made in compliance with their wishes.

Dr. EMERSON:—

Seminary in Contemporary Philosophy.

Philosophy and Psychology: studies of some of the problems raised by scientific methods and discoveries, with special reference to Psychology, and the influence of Psychology upon the direction now being taken by Philosophy. Pragmatism will be considered carefully, as one of the most important movements resultant upon this influence.

EDUCATION

Hereafter the History of Education (Courses I and II in the general announcement or their equivalent) will be required as prerequisite for graduate study in this department. In special cases students may be permitted to pursue graduate work simultaneously with their work in the preliminary courses.

Academic Session, 1909-1910

Professor WHITNEY:—

School Administration.

General school organization and management; the arts of grading and arranging courses of study; teachers' meetings; how to estimate a teacher's work; methods of teaching; consideration of elementary school arts; analysis of text-books, etc.—*Two hours credit, second semester,*

Comparative School Systems.

This course is designed to present the essential features of the school systems of the United States, England, Germany, and France; to compare these systems with each other; and to judge of the efficiency of each in the light of their respective educational aims and national ideals. Among the topics treated are organization, supervision, curriculum, methods of teaching, continuation schools, technical schools, universities, etc. Lectures, prescribed readings and reports.—*Two hours credit, first semester.*

Assistant Professor JOHNSTON:—

The Psychology of Education.

A critical survey of the psychological literature bearing upon education, with reference to determining and working out in the latter part of the course a more systematic and useful presentation of the subject. Special opportunities for constructive and original work in various problems as well as for experimental studies.—*Three hours credit, first semester.*

Educational Theories of the Greeks.

Introductory lectures on early Greek conceptions of nature and of mind; actual systems of education at Sparta and at Athens; educational importance of the Sophists; Xenophon's education of Cyrus, and his Memorabilia of Socrates; Plato's Apology, Crito, Phaedo, and Protagoras. A more detailed study of the text of Plato's Republic, and of selections from Aristotle's Ethics, and Politics in translation will constitute the text work of the course. Dickinson's Greek View of Life, Plato's Republic, and Burnet's Aristotle on Education.—*Three hours credit, first semester.*

Educational Reformers.

A study of the distinctive contributions to educational theory and practice of such pioneers in education as Rousseau, Spencer, Pestalozzi, and Herbart. Lectures, selected readings, and reports.—*Two hours, second semester.*

Seminary in Course of Study.

The theoretical justification of the course of study. An examination into the peculiar educational significance and function of selected subjects from the high school curriculum; the proposed additions and eliminations, and the theory of correlation. Lectures, assigned readings, frequent reports.—*Two hours, first semester.*

Philosophy of Education.

The purpose of this course is to pass in review distinctive contributions to the solution of educational problems. The treatment of topics chosen will approximate the following order: Introductory discussion of the different legitimate aspects of the educative process; a summary account of representative contemporary practical issues which call for theoretical solution; and a more detailed treatment of the practical, historical, biological, and psychological aspects of education. This course is intended to prepare the student for the second semester's work, which supplements the work here outlined by offering the more complex and equally essential philosophical considerations involved. Lectures, selected readings, recitations, and reports.—*Three hours, second semester.*

Assistant Professors JOHNSTON and BERRY:—

The Education of Feeling.

The design of this course is to treat, both historically and constructively, the subject of the training of the feelings in education. A review of the attitudes of Oriental Nations, Greeks, Romans, Scholastics, Renaissance educators, and modern theorists will constitute the historical portion of the work. A consideration of typical, philosophical and psychological attitudes toward the problem will follow this historical survey. The attempt will then be made to construct some workable concept of the relation between the so-called elementary feelings and the complex esthetic, ethical and religious emotions. The course will finally seek to emphasize the necessity of some recognition in educational method and incorporation in educational theory of definite emotional training. If possible, the psycho-pathology of feeling will receive some treatment. Lectures, prescribed reading, and thesis. Students without considerable preparation in philosophy, psychology and education are not advised to undertake the work.—*Two hours, second semester.*

Assistant Professor BERRY:—

School Hygiene.

The work of this course considers the problems connected with the physical welfare and development of children, such as legislation relative to school hygiene; ventilation of school rooms; medical inspection of school children; treatment following medical inspection; nursing systems in public schools; the general care of defectives; methods of dealing with diseases of ear, eye, throat, and skin; nervous derangements; laws of fatigue; hygienic school programs, etc. Lectures, selected readings, and reports.—*Two hours, second semester.*

Summer Session, 1909**Professor WHITNEY:—****School Administration.**

General school organization and management; the arts of grading and arranging courses of study; teachers' meetings; how to estimate a teacher's work; methods of teaching; consideration of elementary school arts; analysis of text-books, etc.

Comparative School Systems.

This course is designed to present the essential features of the school systems of the United States, England, Germany, and France; to compare these systems with each other; and to judge of the efficiency of each in the light of their respective educational aims and national ideals. Among the topics treated are organization, supervision, curriculum, methods of teaching, continuation schools, technical schools, universities, etc. Lectures, prescribed readings, and reports.

Assistant Professor JOHNSTON:—**Psychology of Education.**

In this course is presented in systematic form the hitherto scattered material of psychology as related to Education with reference to such topics as the following: the nature of education from a psychological point of view; mental growth as conditioned by self-activity; the solution of a problem as a typical condition for true self-activity; the educational significance of the problem or purpose; the interpretation of various mental processes and categories from the viewpoint of the problem solving activity; review of various experimental studies upon learning; educational psychology as social psychology; the importance of the interaction of minds as a condition of mental growth.

Philosophy of Education.

The purpose of this course is to outline and to examine briefly the distinguishable aspects of the educative process. The attempt will be made to interrelate our industrial, biological, psychological, æsthetic, religious, and sociological ideals. The course is planned for those students who desire sufficient acquaintance with educational theory to enable them to read critically the modern literature on the subject. This course is practically equivalent to Course 6 in the University Calendar.

Educational Reformers.

A study of the distinctive contributions to educational theory and practice of such pioneers in education as Rousseau, Kant, Pestalozzi, Herbart, and Spencer. Students who have not done some work in the history of Ancient and Mediæval Education should consult the instructor before enrolling. Lectures, selected readings, and reports.

Assistant Professor BERRY:—

School Hygiene.

The work of this course considers the problems connected with the physical welfare and development of children, such as legislation relative to school hygiene; ventilation of school rooms; medical inspection of school children; treatment following medical inspection; nursing systems in public schools; the general care of defectives; methods of dealing with diseases of ear, eye, throat, and skin; nervous derangements; laws of fatigue; hygienic school programs, etc. Lectures, selected readings, and reports.

MATHEMATICS

The courses mentioned below presuppose the usual preparatory course in algebra and elementary geometry, plane, solid, and spherical, together with two years of collegiate study devoted to trigonometry, higher algebra, plane analytic geometry, and differential and integral calculus.

In addition to the courses announced below, advanced work in mathematical reading and research will be arranged, so far as possible, to suit the needs of individual students.

Academic Session, 1909-1910

A. FOR UNDERGRADUATES AND GRADUATES

Professor BEMAN:—

Solid Analytic Geometry.

Frost, with references to Salmon.—*Two hours a week, first semester.*

Differential Equations.

Johnson, with references to Forsyth, Boole, and Mansion.—*Three hours a week, first semester.*

Teachers' Seminary.

Critical study of certain text-books in algebra and geometry, together with the discussion of methods and aims in mathematical teaching, sketches of the history of mathematics, lists of books for teachers, etc.—*Two hours a week, throughout the year.*

Quaternions.

Two hours a week, second semester.

Professor ZIWET:—**Advanced Mechanics.**

Kinetics of the rigid body; motion about a fixed point; the problem of the top; relative motion; D'Alembert's equations; general principles of mechanics.—*Three hours a week, second semester.*

Professor HALL:—**[Elementary Theory of Differential Equations.**

A lecture course with references to available literature on the subject. Particular attention will be given to the ideas of Lie.—*Three hours a week, either first or second semester.*

Omitted in 1909-1910.]

Differential Geometry.

The application of the differential and integral calculus to the theory of plane curves, space curves and surfaces.—*Three hours a week, throughout the year.*

Professor GLOVER:—**Higher Algebra.**

The more important topics to be considered in this course are: symmetric functions of the roots, resultants, solution of a system of n linear equations, theorems concerning integral functions of one and two variables, and elements of the theory of substitutions.—*Three hours a week, throughout the year.*

Theory of Annuities and Insurance.

Two hours a week, throughout the year.

Dr. BRADSHAW:—**Projective Geometry.**

This course begins with the geometry of position, Reye's work being used as a text, which is followed by the analytic treatment, including homogeneous projective coördinates and the elements of the theory of invariants.—*Three hours a week, throughout the year.*

Mr. ESCOTT:—

Theory of Numbers.

The principal subjects covered are congruences, quadratic residues and forms, applications of these theories to the solution of indeterminate equations of the first and second degrees, division of the circle, discovery of the prime factors of numbers, and the distribution of primes, also the composition of binary quadratic forms, and the analytical theory of numbers. Text-book: Lejeune-Dirichlet's *Zahlentheorie*, or Cahen's *Théorie des Nombres*, with references to Mathews, Bachmann, Gauss, and others.—*Two hours a week, throughout the year.*

B. PRIMARILY FOR GRADUATES

Professor BEMAN:—

Advanced Differential and Integral Calculus.

Goursat's *Cour d'analyse mathématique*.—*Two hours a week, throughout the year.*

Higher Plane Curves.

Salmon, with references to Clebsch.—*Two hours a week, second semester.*

Linear Differential Equations.

Two hours a week, second semester.

Professor ZIWET:—

Theory of the Potential.

Newtonian attraction; Newtonian and logarithmic potentials; the equations of Laplace and Poisson; harmonic functions; the principle of Dirichlet; the problems of Green and Dirichlet and the Green function.—*Three hours a week, first semester.*

Mathematical Theory of Elasticity.

Stress; strain; relation between stress and strain; particular problems, especially those of torsion and flexure; the general methods of integrating the equations of elasticity.—*Two hours a week, throughout the year.*

Hydrodynamics.

The general equations; motion of a solid through a fluid.—*Two hours a week, throughout the year.*

Professor MARKLEY:—

Theory of Functions.

The first part of this course deals with functions of a real variable including a development of the fundamental ideas of irrational numbers, continuity and convergence, and the direct application and use of these ideas in differentiation, integration, and development of functions in series. The second part of the course is devoted to functions of a complex variable. It aims to present the fundamental ideas of complex quantities, their geometric representation and their calculus, and to furnish an introduction to the theories of functions of a complex variable as developed by Cauchy, Riemann, and Weierstrass.—*Three hours a week, throughout the year.*

Theory of Functions. [Advanced Course.]

This course is a direct continuation of the preceding. It includes the theory of elliptic functions.—*Two hours a week, throughout the year.*

Professor GLOVER:—

Seminary in the Theory of Probabilities and Insurance.

This course is designed for graduate students who wish to study some of the more advanced problems in the theory of probabilities, with applications to the theory of mathematical statistics. The following subjects will be considered: direct and inverse probability, theory of mathematical risk, theory of the law of error, Lexis's theory of population, old age pensions, sickness insurance, Pearson's method of moments, theory of correlation, graduation of mortality and sickness tables, theory of selection, and distribution of surplus.—*Hours to be arranged, throughout the year.*

Assistant Professor FORD:—

Harmonic Analysis.

The partial differential equations of mathematical physics; Fourier series; the Fourier integral; spherical harmonics; Bessel functions; the problem of boundary values for partial differential equations.—*Two hours a week, throughout the year.*

Infinite Series and Products.

The principal topics treated are tests for convergence, transformation of series, multiple series, the special properties of power series, uniform convergence, differentiation of series, functions defined by definite integrals.—*Two hours a week, throughout the year.*

Theory of Divergent Series.

In 1909-1910 the special topic treated will be the summation of divergent power series by means of definite integrals and algebraic continued fractions. The investigations of Borel and Padé upon this subject will form the basis of the course.—*Two hours a week, throughout the year.*

Summer Session, 1909

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in mathematics along lines best suited to their needs. Such work when satisfactorily completed will be accepted as a partial fulfillment of the residence requirements for such degree. The courses offered below have met the needs of the greater number. Other courses will be given, should the necessity arise.

FOR GRADUATES AND UNDERGRADUATES

Professor GLOVER:—

Differential Equations.

An elementary course in ordinary differential equations.
Text-book: Johnson's Differential Equations.

Professor MARKLEY and Dr. BRADSHAW:—

Projective Geometry.

Lectures and assigned reading and recitations in text-book.

Professor MARKLEY:—

Theory of Functions.

Lectures and assigned reading and recitations.

Those desiring to take this work are requested to correspond with the instructor in charge.

ASTRONOMY

The courses indicated below (which are open also to properly qualified undergraduates) presuppose a knowledge of Descriptive Astronomy and of Mathematics through Calculus.

In addition to the courses announced below, advanced work in Theoretical and Practical Astronomy and in Astrophysics will be arranged as far as possible to suit the needs of individual students. To this end the instruments of the Observatory, when not otherwise employed, will be available for the use of such students as have the technical ability to use them to advantage.

The Astronomical Library at the Observatory is reasonably complete, including in round numbers about 2,500 volumes. These

include nearly all of the printed star catalogues, most of the modern publications of observatories and astronomical societies, and nearly complete files of the astronomical periodicals. This is a reference library, and as such is available to students.

Academic Session, 1909-1910

Professor HUSSEY and Assistant Professor CURTISS:—

Practical Astronomy.

The elements of Spherical Astronomy. Theory of the sextant and transit and their use in the solution of practical problems, including the determination of instrumental constants, time, latitude, longitude, and azimuth.—*Two hours, both semesters.*

Advanced Practical Astronomy.

Studies in Spherical Astronomy. Theory of the equatorial and its use in observational work, illustrative of the best modern practice. Reduction of measurements. Open to those who have had the preceding course or its equivalent.—*Two hours, both semesters.*

Theoretical Astronomy.

The elements of Celestial Mechanics, and theory and practice in the determination of parabolic and elliptic orbits. A knowledge of Integral Calculus is required.—*Three hours, first semester.*

Advanced Theoretical Astronomy.

Definite determination of orbits. Comparison and adjustment of observations. Theory of Interpolation, Mechanical Quadrature, Special and General Perturbations. The selection of topics will be determined somewhat by the needs of those taking the course.—*Hours and credit to be arranged, second semester.*

Theory of Errors, and Method of Least Squares.

Theory of the comparison and adjustment of observational data according to the Method of Least Squares. Construction and discussion of empirical curves in the solution of experimental problems.—*Two hours, second semester.*

History of Astronomy.

The History of Astronomy from the time of Newton, but treating especially of the development of the science during the past century. The course presupposes a general knowledge of Descriptive Astronomy.—*Two hours, first semester.*

Astrophysics.

Introductory descriptive course. The principles of spectroscopy and bolometry. General treatment of methods and results, having reference especially to the interpretation of solar and stellar phenomena. The course presupposes a general knowledge of Descriptive Astronomy, Physics, and Calculus.—*Two hours, second semester.*

Variable Star Studies.

Lectures at the University, devoted particularly to the recent development of the subject along photometric and spectroscopic lines, and theoretical and observational work at the Observatory.—*Two hours, first semester.*

Spectroscopic Binaries.

Theory and practice in the determination of orbits from spectroscopic measurements of motion in the line of sight, and from photometric observations of variation in brightness. The course in Astrophysics is a prerequisite.—*Two hours, first semester.*

Summer Session, 1909

Professor HUSSEY and Assistant Professor CURTISS:—

Practical Astronomy.

Theory of the sextant and transit and their use in the solution of practical problems, including determinations of instrumental constants, time, latitude, longitude, and azimuth. Recitations in Room 22, U. H., at 11, during the first four weeks of the term; laboratory work at the Observatory, partly in the afternoon, and partly in the evening, throughout the term.

Theoretical Astronomy.

The elements of Celestial Mechanics and theory and practice in the determination of parabolic and elliptic orbits. Integral Calculus is a prerequisite.

PHYSICS

The courses announced below presuppose about one and a half years' collegiate work in physics, viz., a course in mechanics, sound, light, electricity, magnetism, and heat, four hours a week, for one year; a beginners' course in laboratory work, two or three hours a week for half a year; and a course in primary and secondary batteries, two hours a week for a half year.

The courses in Electrochemistry, Mathematical Electricity, the Theory of Light, the Theory of Heat, Thermodynamics, and the Laboratory Courses in Sound and Light are primarily for graduates; the other courses are primarily for advanced undergraduate students, but they are found to be beyond the work done in many colleges.

Graduate students, who are properly qualified by their previous training, have opportunity for original research in the physical laboratory under the immediate supervision of the director and his associates.

Academic Session, 1909-1910

Professor CARHART:—

Alternating Electric Currents.

An intermediate course based on Franklin & Williamson's *Alternating Electric Currents*.—*Three hours a week, first semester.*

Professor CARHART and Assistant Professor HENDERSON:—

Electrochemistry.

This subject is studied from the physical as distinguished from the chemical point of view. It includes the modern theory of voltaic cells, and especially standards of electromotive force and concentration cells.—*Four hours a week, second semester, including laboratory work.*

Professor REED:—

The Theory of Sound.

Lectures and laboratory work. The lectures are based on the works of Helmholtz and Rayleigh. The laboratory work involves acoustical and optical measurements of period, amplitude, and phase difference of simple and compound vibrating systems; also the study of sensitive flames, organ pipes, resonators, and the application of stroboscopic methods to oscillating systems.—*Lectures, two hours a week; laboratory work, twice a week, first semester.*

The Theory of Light: Preston.

The work involves a careful study of the text, with supplementary reading. The laboratory work includes measurements with the focometer, spectrometer, polarimeter, and interferometer; determination of wave-lengths by diffraction and interference methods; and a study of arc and solar spectra.—*Lectures and recitations, two hours a week; laboratory work, twice a week, second semester.*

Advanced Laboratory Work in Sound.

The work is devoted to a repetition of the classical experiments of Mach, Boltzmann, and Helmholtz; to the study of special problems, and to the application of optical methods to acoustical measurements.—*Twice a week, first semester.*

Professor PATTERSON:—

Applied Electricity.

For courses in Applied Electricity, see Electrical Engineering in the Announcement of the Department of Engineering. Seventeen courses in all are there described in detail. They cover the theory, testing and design of electric machinery, transformers, lamps, storage batteries, telegraphy, telephony, electric distribution, power plants, railways, etc. Many of these courses, for example, those in dynamo-electric machinery (both direct and alternating current), in alternating current phenomena, etc., have frequently been accepted toward advanced degrees.

Assistant Professor RANDALL:—

Laboratory Work in Heat.

This course comprises determinations of specific heat of solids and liquids; heat of fusion and of vaporization; the coefficient of expansion of solids, liquids, and gases; also experiments on the constants of gases and vapors, such as the specific heat of gases, vapor density, vapor pressure, etc.; also the determination of the mechanical equivalent of heat by electrical methods.—*Twice a week, either semester.*

Measurements of High Temperature.

In this course opportunity is offered to work with the gas-thermometer, thermo-element, resistance thermometer, and radiation pyrometer.—*Once a week, either semester.*

The Theory of Heat: Preston.

Two hours a week, first semester.

Thermodynamics.

Lectures and recitations *two hours a week, second semester.* This course covers the principles of modern thermodynamics, as developed by Gibbs, Planck, and Duhem. Special emphasis is placed on the application of those principles to numerous problems in physics and chemistry.

Assistant Professor SMITH:—

Electrical Measurements.

This course comprises, in addition to all the refined methods of measuring resistance, current, and electromotive force, a thorough treatment of the subjects of capacity, induction, and magnetism. Lectures, *twice a week, first semester*; laboratory work, *twice a week, first semester*; *three times a week, second semester*.

Dr. KUNZ:—

Mathematical Electricity.

This course is a treatment of the subject with the use of higher mathematics. Special attention is given to the Newtonian potential function, polarized distribution, electrostatics, electrokinetics, electromagnetism, and electromagnetic waves.—*Three times a week, first semester*; *twice a week, second semester*.

The Electron Theory.

This course of lectures is based on J. J. Thomson's "Corpuscular Theory of Matter." Special attention will be given to the theory of Roentgen rays, thermal radiation, number of corpuscles in an atom, magnetism in iron, and radio-activity. The aim of the course is to give a direct physical insight into the nature of the phenomena, but some of the problems will receive advanced mathematical treatment.—*Twice a week, second semester*.

Professors CARHART and REED:—

Physical Colloquium.

Reports on original research, together with analysis and discussion of important articles in current physical literature. All instructors and assistants in the department take part in the Physical Colloquium. While intended primarily for graduate students, it is also open to undergraduates receiving special permission.

Summer Session, 1909

Graduate students qualified to enroll for a higher degree will be afforded an opportunity to do work in Physics in the direction best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number.

Professor REED:—

FOR GRADUATES AND UNDERGRADUATES

Sound and Other Oscillatory Phenomena.

This course includes the study of the origin, propagation and phenomena of sound; the differential equations of motion for systems having one and two degrees of freedom; the characteristic phenomena of free, forced, and damped vibrations; resonance; applications of Fourier's series to specific cases; theory of electric oscillations; stationary electric waves; electric resonance and tuning. Lectures, laboratory work, and reading.

Theory of Light.

The aim of this course is to present to the student an intelligent account of the fundamental facts in modern optics. A brief treatment of geometrical optics is followed by the study of the phenomena of interference, diffraction, dispersion, absorption and polarization from the theoretical and experimental standpoints. The large equipment of the laboratory in optical apparatus renders the work in this line especially attractive. Text-book: Preston's Theory of Light.

PRIMARILY FOR GRADUATES

Advanced Work in Light.

Laboratory work and reading, for students qualified to pursue independent investigation. Text-book: Mann's Advanced Optics.

Advanced Work in Sound.

Laboratory work and reading along some line of research work involving acoustic or electric vibrations.

FOR GRADUATES AND UNDERGRADUATES

Assistant Professor RANDALL:—

Theory of Heat.

Recitations and reading. Text-book: Preston's Theory of Heat.

Laboratory Work in Heat.

This course corresponds to the regular Course 8. It is offered for those who wish to become acquainted with the more advanced methods for measurements in heat. The course includes measurements of the expansion of solids, liquids, and gases, the specific heat of liquids and gases, vapor tensions, and thermal conductivities.

Measurements of High Temperatures.

This course corresponds to the regular Course 17. Opportunity is offered to work with the gas thermometer, thermo-element, resistance thermometer, and radiation pyrometer.

Assistant Professor SMITH:—

Electrical Measurements.

Recitations at 8, laboratory work daily two hours. This course corresponds to the regular Course 5 in physics and includes measurements of resistance, electromotive force, current, capacity, self and mutual induction, and a study of the magnetic properties of iron and steel. Text-book: Carhart and Patterson's Electrical Measurements.

Advanced Electrical Measurements.

Continuation of the preceding course. Laboratory work and reading, daily, at hours to be arranged.

CHEMISTRY

Resident graduates may enter upon any of the courses in chemistry in this University for which they are qualified. Following are brief statements of the more important of the advanced courses, including those taken in work for the higher degrees.

To be received as a candidate for a higher degree with chemistry as a major subject, the preparation should include the branches of general, analytical, and organic chemistry. The extent of work in these branches must have been equivalent in substance to Courses 1, 2, 3, 5, and 7 (University Calendar for 1908-1909), making in all about twenty-five hours of undergraduate credit.* If chemistry is taken as a minor subject by a student registered for a higher degree, preparation must have been made equivalent at least to undergraduate Courses 1, 2, and 3.

Graduate students who are not candidates for a degree, and those who are preparing for registration as candidates for higher degrees according to the requirements above stated, will be directed in such chemical studies as they require.

THE LIBRARY OF CHEMISTRY is a very complete one in all the branches of pure chemistry and its applications. The sets of the journals are complete from the beginning, with duplicate sets of the more important, for the convenience of readers.

*An "hour of credit" implies the satisfactory completion of work equivalent to one exercise a week during one semester.

Academic Session, 1909-1910

Professor JOHNSON:—

Advanced Qualitative Analysis.

Following undergraduate Course 3 (University Calendar for 1908-1909).

Professor CAMPBELL:—

Chemical Colloquium.

The Chemical Colloquium meets twice a month. Each member of the teaching staff has an opportunity to present at some meeting during the year an account of recent research work in the field in which he is particularly interested.

Quantitative Analytical Chemistry.

To follow undergraduate Course 5 (University Calendar for 1908-1909) or its equivalent. Laboratory work, directed by lectures, in some chosen field of analytical research.

Research in Chemical Technology.

(In conjunction with Professor WHITE.)

The laboratory is equipped for research along the following lines:

1. Influence of heat and mechanical treatment on the constitution of iron and steel.
2. Manufacture of Portland cement with special reference to the influence of composition and temperature of burning upon the physical properties of the finished cement.
3. Destructive distillation of coal, with special reference to the manufacture of gas.
4. Electrometallurgy and applied electrochemistry.
5. Gas analysis, calorimetry and photometry.
6. Assaying of gold and silver ores and research in the technical treatment of ores.

Professor GOMBERG:—

Lectures on the Chemistry of Carbon Compounds.

A beginning course with library studies.—*Five times a week, the first semester.*

Seminary in Special Topics in Organic Chemistry.

Following undergraduate Course 7 (University Calendar for 1908-1909) or its equivalent.—*Two times a week, second semester.*

Organic Synthesis and Ultimate Analysis.

(In conjunction with Dr. CONE).

Laboratory work. .

Investigation in Organic Chemistry.

(In conjunction with Dr. CONE).

Professor BIGELOW:—

Physical and Theoretical Chemistry.

This course is intended to cover, in an elementary manner, most of the chief topics of modern theoretical and physical chemistry.—Lectures, *four hours a week, second semester.*

Laboratory Work in Selected Topics of Inorganic Chemistry.

This work is preparatory to research, and is adapted to the needs of those intending to teach.

Laboratory Research in Physical and Electrochemistry.

Seminary in Special Topics of Physical Chemistry.

Conferences and reading.

Professor SCHLOTTERBECK:—

Phytochemical Research.

Laboratory investigation of the chemical constitution of alkaloids and other principles of plants of related species.

Food and Drug Analysis.

Laboratory work in analytical methods for the control of food and drugs.

Advanced Microscopy.

Laboratory work in microscopical methods for the control of food and drugs.

Professor STEVENS:—

Drug Assaying, and Pharmacopœial Standards.
Laboratory work.

Professor WHITE:—

Chemical Technology.

Lectures on the main chemical industries, inorganic *in the first semester*, and organic *in the second semester*. Among the subjects treated are utilization of fuel, purification of water, the alkali and acid industries, electrochemistry, cement, wood and coal distillations, sugar, starch, glucose, paper, bleaching, dyeing, and tanning.—*Five hours a week, throughout the year.*

Research in Chemical Technology.

(In conjunction with Professor CAMPBELL, as given above).

Assistant Professor LICHTY:—

Laboratory Work with the Polariscope and the Spectroscope.

Laboratory Research in Inorganic Chemistry.

Assistant Professor HALE:—

Laboratory Research in Organic Chemistry.

Stereochemistry, including a General Study of Isomerism.
Lectures, twice a week, first semester.

The Heterocyclic Derivatives in Organic Chemistry.

Lectures, twice a week, first semester.

[This course alternates with the course in Stereochemistry.]

Mr. SMEATON:—

History of Chemistry.

Lectures and historical reading, covering the history of the science. *Two hours a week, second semester.*

Laboratory Research in Cryoscopic Methods.

Dr. CONE:—

The Chemistry of Organic Dyes.

Lectures, and reading, twice a week, first semester.

Organic Synthesis and Ultimate Analysis.

(In conjunction with Professor GOMBERG, as given above).

Investigation in Organic Chemistry.

(In conjunction with Professor GOMBERG, as given above).

Mr. ZIMMERSCHIED:—

Quantitative Analysis.

Laboratory work.

Micrometallography.

Lectures and laboratory work.—*Second semester only.*

Dr. LIND:—

Advanced Physical and Theoretical Chemistry.

Chemical Dynamics and the Phase Rule.—Lectures, *two hours a week, first semester.*

Laboratory Work in Physical Chemistry.

Standard methods of determining molecular weights, studies of solutions, dissociation, conductivity, etc.—*Either semester.*

Electrochemistry.

Conductivity, electro-motive force, standard cells, decomposition potentials, etc.—*Two lectures a week.*

Electrochemistry (Laboratory.)

Experimental work illustrating the fundamental principles of the subject.—*Either semester.*

Theory and Practice of Exact Measurement.

Laboratory practice in glass blowing, calibration, and construction of apparatus.—*One lecture and two laboratory periods.*

Summer Session, 1909

Graduate students competent to enroll for a higher degree will be afforded an opportunity to do work in Chemistry along the lines best suited to their needs. Such work, when satisfactorily completed, will be accepted as a partial fulfillment of the residence requirement for such degree. The courses offered below are considered well adapted to the greater number.

Professor BIGELOW:—

Theoretical and Physical Chemistry.

Lectures and recitations. Some of the lines of experiment and thought which have culminated in the most important generalizations and theories of chemistry are followed historically and critically. The philosophical aspect of the science is presented with the intent to develop the power of right judgment in a way that shall be of service to teachers and those who may have problems to solve in either pure or applied chemistry.

Professor SCHLOTTERBECK:—

Food and Drug Analysis.

Laboratory work in analytical methods for the control of foods and drugs.

Dr. CONE:—

Organic Preparations.

Laboratory work daily, with reference reading and quiz upon synthetic principles. Ultimate analysis may be included.

Dr. LIND:—

Recent Theory Bearing on Analytical Chemistry.

Lectures following in outline Ostwald's Scientific Foundations of Analytical Chemistry.

Physical-chemical Measurements (Laboratory).

The following determinations are made: Vapor density by the methods of Victor Meyer, Bleir and Kohn, and Dumas; molecular weight measurements by freezing point and boiling point methods; electrical conductivity.

MINERALOGY AND PETROGRAPHY

The following courses in mineralogy and petrography are adapted to the needs of graduate students. All courses presuppose a knowledge of general inorganic and analytical chemistry, as well as the principles of geology. For the course in physical crystallography some knowledge of light is essential.

Academic Session, 1909-1910

Professor KRAUS and Mr. HUNT:—

General Mineralogy.

The lectures include a thorough discussion of the principles of crystallography, the physical and chemical properties of minerals, as also their origin, formation, decomposition, distribution,

and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—Lectures *five times a week*; laboratory work, *five hours a week, first semester*.

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential.—Laboratory work, *nine hours a week, first or second semesters*.

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, formation and origin of minerals.

Mr. HUNT:—

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by means of the physical properties, a very large number of minerals.—Laboratory work, *six hours a week, first or second semesters*.

Qualitative Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first or second semesters*.

Quantitative Blowpipe Methods.

Reading and laboratory work, including practice in assaying by blowpipe methods of various kinds of ores, especially those of gold and silver.—*Six hours a week, to be arranged, first semester*.

Mr. ———.

Lithology.

The lectures include, aside from a review of the rock-forming minerals, a discussion of the classification, origin, and methods of determination of the more important rocks. In the laboratory the student is required to determine by means of the macro-physical properties a large number of rock specimens. Numerous field excursions will be made in order to acquire facility in the rapid determination of rocks in the field.—*Two lectures and two hours laboratory work a week, first or second semesters*.

Petrography.

In this course the microscopic structure and mineralogical composition, classification, origin, and determination of the igneous and metamorphic rocks are discussed.—*Two lectures and three hours laboratory work a week, first and second semesters.*

Professor KRAUS:—

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic-optical instruments.—*Three lectures and three hours laboratory work a week, second semester.*

Current Literature of Mineralogy.

The instructors and advanced students meet once a week to discuss important current and classic literature.—*Second semester.*

Summer Session, 1909

Professor KRAUS:—

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential. Laboratory work.

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, formation and origin of minerals.

Mr. HUNT:—

Qualitative Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.

Mr. COOK:—

Lithology.

The lectures include, aside from a review of the rock-forming minerals, a discussion of the classification, origin, and methods of determination of the more important rocks. In the laboratory the student is required to determine by means of the

macrophysical properties a large number of rock specimens. Numerous field excursions will be made in order to acquire facility in the rapid determination of rocks in the field.

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by means of the physical properties, a very large number of minerals. Laboratory work.

GEOLOGY

The Courses in Geology which are arranged for graduate students presuppose a knowledge of the general principles of geology and mineralogy or of geology and elementary zoology, according as the work is directed toward the physical or the paleontological side of geology. The courses in Elements of Geology (1) and Historical Geology (2), or their equivalents, are assumed to have been already taken in course. For students who plan to become teachers of geology, or to engage in research work, it is a distinct advantage for them as undergraduates to map out their courses of study. Inorganic chemistry and physics, including the principles of mechanics, are regarded as basal studies for any long course in geology; and these courses should, so far as is possible, be taken up early in the undergraduate study, and be followed by a year's work in mineralogy. Sufficient French and German to enable the student to read with ease the scientific literature of the subject should, if possible, be acquired before graduation. A knowledge of elementary surveying will greatly aid the student in his geological studies, and may be supplemented by the course in field geology during the spring semester.

For the graduate and other courses of the geological department the collections of rocks and fossils which are on exhibition in the museum or stored in the cases of the geological laboratory, are made available for purposes of instruction, and, in the case of advanced students, for research work. A considerable quantity of carefully chosen vertebrate fossils has recently been added to the museum collection and is available for study by advanced students. At the observatory are installed a number of modern seismographs which will be used to illustrate the courses in seismic geology. The new Israel C. Russell Seminary Room, with its series of journals, maps, survey reports, etc., and especially its collection of geological and geographical brochures, is supplemented by the large collection of geological and geographical journals in the general library.

The graduate courses now offered by the department are in the lines of tectonic, seismic, paleontologic, glacial, and economic geology. Research work along the lines indicated is especially encouraged, and students may elect geology either as a major or a minor

subject for a higher degree (see page 15). For the degree of Master of Arts a minimum of thirteen credit hours of geological work is required when the subject is elected as a major, and six hours when elected as a minor.

Academic Session, 1909-1910

FOR GRADUATES AND UNDERGRADUATES

Professor HOBBS and Mr. ALLEN:—

Structural Geology.

A thorough course in structural geology consisting of lectures, laboratory work, and special map exercises, the object being not only to familiarize the student with the structures of the rocks within the earth's crust, but also to give him a measure of skill in the preparation and reading of geologic maps.—*Five hours a week, second semester.*

Professor HOBBS:—

Seismic Geology.

A study of earthquakes from both the geological and geophysical sides. The great importance which seismology has assumed within the last few years is the warrant for its separate treatment in departments of geology. The distribution of seismicity over the globe, and within special provinces, the methods of locating lines of special danger from earthquakes, the mitigation of their disastrous consequences, the "distant" study of greater earthquakes, and the use of earthquake instruments, will all be included in the course.—*Two hours a week, first semester.*

Assistant Professor CASE:—

Origin and Development of Vertebrate Animals and Man.

A lecture course describing the ancestral forms with the lines of descent of the more important domestic and wild animals. The origin and descent of man is discussed with particular care as a special topic.—*Two hours a week, first semester.*

Mr. LEVERETT:—

Glacial Geology.

A course of ten lectures with accompanying field excursions dealing with the several glaciations of portions of the globe in past geological periods, and giving special prominence to the Pleistocene glaciations. The several drift sheets of Europe and North America will be compared, and the incident lake and river histories discussed.—*Two hours a week, second semester.*

Mr. SCOTT:—

Physiography.

A general course in physiography having special reference to the needs of the teachers of science in secondary schools. Excursions weekly on Saturday mornings during the open season.—*Three hours a week, first semester.*

Field Geology.

A study of the methods of field mapping in geology. Each student equipped with simple instruments will prepare a series of topographic maps of diversified districts in the vicinity of Ann Arbor, and enter upon them the distribution of the glacial formations.—*Three hours a week, second semester.*

Elementary Meteorology.

This course is designed to follow the course in physiography and is an elementary treatment of the dynamics of the atmosphere. In it will be discussed the properties and movements of the atmosphere, weather and its variations, with some account of weather prediction. Lectures and laboratory.—*Two hours a week, second semester.*

Mr. ALLEN:—

Economic Geology.

A general course treating of the nature and distribution of metallic and non-metallic resources with special emphasis on minerals of prime industrial importance. Geology I and a course in mineralogy are prerequisites.—*Three hours a week, second semester.*

Soil Geology.

A comprehensive survey of the subject including the origin of soils, their physical and chemical constitution in relation to plant growth, the influence of climate on soil fertility, irrigation and drainage, tillage, fertilizers, etc., and a consideration of the geology of the United States in relation to geologic, physiographic, and climatic factors.—*Three hours a week, first semester.*

Professor HOBBS, Assistant Professor CASE, Mr. LEVERETT,
Mr. SCOTT and Mr. ALLEN:—

Current Literature of Geology.

All advanced students of the department will meet weekly for reports and discussion of the recent literature of geology. These reports will be replaced occasionally by the presentation of the results of research work by members of the department or by advanced students.—*One hour, first semester, without credit.*

PRIMARILY FOR GRADUATES

Professor HOBBS:—

History of Geology.

An advanced course treating of the development of the science and the lives and teachings of its founders, given in 1910-1911 and alternate years.—*Five hours a week, first semester.*

Tectonic Geology.

An advanced course which treats of the larger problems of the tectonics of the globe as developed especially by Eduard Suess in his great work, *The Face of the Earth*. The work will be conducted by reports and discussions on the seminary plan of specially selected chapters from the three volumes of the work cited. Given in 1909-1910 and in alternate years.—*Five hours a week, first semester.*

Assistant Professor CASE:—

Systematic Invertebrate Paleontology.

A course dealing with the chief forms of invertebrate fossils both from the organic standpoint of origin and development, and from the faunistic side as indicators of the different geological formations. Lectures and laboratory work.—*Five hours, first semester.*

Vertebrate Paleontology.

A course in comparative osteology and the morphology of the hard parts of vertebrates. Especial attention is paid to the origin and development of structures in extinct forms which lead up to the living ones. The facts of paleontology are brought to bear on the questions of adaptive radiation and the migration of faunas.—*Five hours, second semester.* Given in alternate years, beginning in 1909.

Development of the North American Continent.

A lecture and reading course designed to bring out in some detail the essential points in the history of the North American Continent. This course involves a study of particular regions as illustrating the general development of the whole and a study of the wider problems of world relations.—*Five hours per week, second semester.* Given in 1910 and alternate years.

Mr. ALLEN:—

Ore Deposits.

A study of the nature, genesis, and exploitation of ore deposits, with special emphasis upon the iron, copper, silver and nickel deposits of the Lake Superior region. This course is intended for students who have finished Mineralogy 2, or its equivalent, and Geology 1 and 2. Geology 16 should precede this course, but is not required by students who are otherwise qualified.—*Five hours a week, first semester.*

Professor HOBBS, Assistant Professor CASE, Mr. LEVERETT,
and Mr. ALLEN:—

Special and Research Work.

The department directs special and research work along the lines of dynamic geology, paleontology, glacial and economic geology. The courses in Seismic Geology and in Systematic Invertebrate Paleontology, especially, may be continued as definite courses.

Summer Session, 1909

Mr. SCOTT:—

Elementary Geology.

This course is intended as an introduction to the study of Geology and will treat of the forces which modify the surface of the earth and the effects of these forces. Lectures, recitations, and excursions.

Teachers' Course in Physiography.

A course especially adapted for teachers and students of physical geography, involving a discussion of the methods by which earth features have been developed, and including an account of the atmosphere and the use of various instruments, maps, weather charts, etc., available for teaching. Lectures, recitations, and excursions.

Field Geology.

An introductory course in the methods of field geology. With the use of simple instruments, maps will be made of areas in the vicinity of Ann Arbor, and the various glacial formations will be indicated thereon.

ZOOLOGY

The courses here announced presuppose a year's work in general biology, such as is carried on in this University conjointly by the departments of botany and zoology.

Graduate students will often find the elementary work in general biology of value to them, and they can rarely omit, without loss, any of the courses in zoology that are open to undergraduates.

A description of the laboratory is given on page 27. A library, shelved in the laboratory, contains sets of the important English and foreign periodicals, as well as many monographs, and other separate publications. It contains also an extensive collection of books and articles relating to the invertebrate fauna of fresh waters. The library of the Department of Medicine and Surgery, which is rich in literature of vertebrates, is accessible to students. The original papers in connection with both lectures and laboratory work are placed in the hands of students, and special reading is required.

A student who selects zoology as a minor for the master's degree will usually pursue but one of the lines of work indicated below, and will not undertake research work. If zoology be chosen as a major, the work may include a research.

For the doctor's degree a minor in zoology involves about as much work as a major for the master's degree, but may not include research.

Those electing zoology as a major for the doctor's degree are expected to complete all the courses offered. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of work on the minors. In his second year of residence, in addition to completing the work mentioned, he is expected to repeat a designated piece of research work in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of zoology and on zoological history and theory. At the least, one year must be devoted to the research which is to be embodied in the doctor's dissertation.

For suggestions as to the order of courses, consult the undergraduate announcement.

Those electing zoology as a major will find it of advantage to select, as a minor study, some one of the following subjects: Anatomy, histology, botany, physiology, palæontology, physiography, physiological psychology. Less closely related to work in bacteriology, physiological chemistry, physical chemistry, organic chemistry, and geology.

Academic Session, 1909-1910**A. FOR GRADUATES AND UNDERGRADUATES**

Professor REIGHARD:—

Vertebrate Zoology. (Comparative Anatomy and Physiology).

Lectures on the comparative anatomy and comparative physiology of vertebrates. Laboratory work on vertebrate types, fish, amphibian, reptile, bird and mamal. The course may be taken independently of the natural history of vertebrates, or in preparation for it. It is of value to those students preparing to study medicine or dentistry who do not wish to take the natural history of vertebrates, as well as to teachers and others.—*Five hours, first semester.*

Vertebrate Zoology. (Natural History of Vertebrates).

This course seeks to acquaint the student with the classification of vertebrates, with special reference to the local forms, and with their habits and external adaptations. It includes field work, carefully planned and regularly carried out, on the field recognition and habits of fishes, amphibia, birds and mammals. Emphasis is laid on methods of field observation and on field notes. The data collected, together with laboratory experiments, are made the basis of a discussion of the *principles of animal behavior*. The course is best preceded by the course in Comparative Anatomy, but exceptions may be made to this requirement.—*Four hours, second semester.*

Organic Evolution.

Illustrated lectures, serving as an introduction to zoology. The lectures deal with the evidences for evolution drawn from classification, structure, development, palæontology, distribution, and variation, and under the head of factors, with such topics as natural selection, the inheritance of acquired characters, mutation and orthogenesis.—*One hour, first semester.*

Systematic Zoology: The Fishes.

Students will work on the local fauna.—*Two or more hours, throughout the year.*

Assistant Professor GLASER:—

Embryology of Vertebrates.

This course aims to give an introduction to the principles of embryological science as illustrated by the development of vertebrates. The lectures will be comparative; the laboratory work, largely on the organogeny of the chick, will be supplemented by demonstrations of other embryos. Considerable attention will be given to embryological laboratory methods. This course should be preceded by Zoology 2, or some other adequate equivalent in vertebrate anatomy, histology, and physiology.—*Five hours, first semester.*

Physiological Zoology.

A course in the general physiology of animals, dealing with the processes occurring in living matter. The course is intended to lay a basis for an understanding of modern experimental work in this field, and of the theories based upon it, as well as to serve as an introduction to courses in the special physiology of man. There are regularly two lectures or recitations per week, and one laboratory period.—*Two hours, second semester.*

Heredity.

This course gives exposition and critical discussion of the results of recent investigations in heredity. Among other topics, special attention will be paid to the following: Physical and mental inheritance in man, Mendel's law, the law of ancestral inheritance, the practical application of known principles of heredity in animal breeding. The lectures will be non-technical in character. The course should be preceded by the course in Organic Evolution. It should be of value to students specializing in psychology, medicine and law, as well as to those following strictly zoological lines.—*Two hours, second semester.*

Organic Evolution, Supplementary Course.

This course is meant to afford an opportunity to small sections for reading and for the study of illustrative material in connection with the course in Organic Evolution, as well as for the development of subjects, such as the history of evolution, not included in the shorter course.—*One hour, first semester.*

Dr. _____:—

Invertebrate Zoology.

This course embraces a general survey of the morphology, classification, distribution, and activities of the invertebrate animals. The laboratory work consists of (1) the dissection of one

and uses. The laboratory work is devoted to the study of crystal forms and the determination of minerals by means of their physical characteristics.—Lectures *five times a week*; laboratory work, *five hours a week, first semester*.

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential.—Laboratory work, *nine hours a week, first or second semesters*.

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, formation and origin of minerals.

Mr. HUNT:—

Determinative Mineralogy.

It is the aim of this course to give the student ample opportunity to determine by means of the physical properties, a very large number of minerals.—Laboratory work, *six hours a week, first or second semesters*.

Qualitative Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.—*Two lectures and two hours laboratory work a week, first or second semesters*.

Quantitative Blowpipe Methods.

Reading and laboratory work, including practice in assaying by blowpipe methods of various kinds of ores, especially those of gold and silver.—*Six hours a week, to be arranged, first semester*.

Mr. ———.

Lithology.

The lectures include, aside from a review of the rock-forming minerals, a discussion of the classification, origin, and methods of determination of the more important rocks. In the laboratory the student is required to determine by means of the macro-physical properties a large number of rock specimens. Numerous field excursions will be made in order to acquire facility in the rapid determination of rocks in the field.—*Two lectures and two hours laboratory work a week, first or second semesters*.

Petrography.

In this course the microscopic structure and mineralogical composition, classification, origin, and determination of the igneous and metamorphic rocks are discussed.—*Two lectures and three hours laboratory work a week, first and second semesters.*

Professor KRAUS:—

Physical Crystallography.

A critical study of the various properties of crystals, including the use of the polarizing microscope and other crystallographic-optical instruments.—*Three lectures and three hours laboratory work a week, second semester.*

Current Literature of Mineralogy.

The instructors and advanced students meet once a week to discuss important current and classic literature.—*Second semester.*

Summer Session, 1909

Professor KRAUS:—

Crystal Measurements.

This course involves the measurement, calculation, and projection of crystals. The measurements are made by means of the reflecting goniometer. For this course a knowledge of spherical trigonometry is essential. Laboratory work.

Research Work.

For students who are properly qualified, opportunity is given for original research along the lines of crystallographic measurements, chemical crystallography, formation and origin of minerals.

Mr. HUNT:—

Qualitative Blowpipe Methods.

This course involves the use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals.

Mr. COOK:—

Lithology.

The lectures include, aside from a review of the rock-forming minerals, a discussion of the classification, origin, and methods of determination of the more important rocks. In the laboratory the student is required to determine by means of the

B. PRIMARILY FOR GRADUATES

Professor REIGHARD:—

Investigations in

- a) The embryology of the lower vertebrates.
- b) The behavior of fishes and other lower vertebrates, field and laboratory studies.
- c) Experimental field studies in evolution.

Assistant Professor GLASER:—

Problems in Embryology and Morphogenesis.

Dr. RUTHVEN:—

Problems in Geographical Distribution.

Dr. PEARSE:—

Problems in the Reactions of Organisms to Light.

Dr. HEGNER:—

Problems in Cytology.

Dr. _____:—

Work Arranged on Consultation.

The ZOÖLOGICAL FACULTY:—

1. Current Literature of Zoölogy.

The instructors and advanced students hold bi-weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussion. Although all are welcome to the meetings, the membership is restricted. Students who wish to become active members should consult Professor REIGHARD.—
One hour a week, throughout the year.

2. Zoölogical Seminary.

The work of the seminary will vary from year to year, but will always include some or all of the following topics:

- a. History of zoology.
- b. History and theory of zoological pedagogy.
- c. Discussion of classical works on zoology.
- d. Discussion of personal investigations by members of the staff.
- e. Discussion of controverted biological problems of the day.

At the beginning of each year one or more current questions will be selected and portions of each subject assigned to members of the seminary. At the end of the year symposia will be held on these subjects.

Bi-weekly meetings throughout the year. Those who wish to become members should consult Professor REIGHARD.—*One hour per week.*

3. The Bird Club:—

Informal meetings of bird students are held every Friday evening during the second semester in the Museum. It is the purpose of the club to bring together for mutual help those interested in the study of birds. The club is open to all, whether students or not, and the work is so planned as to be of help to beginners as well as to those of experience.

Summer Session, 1909

Assistant Professor GLASER:—

Embryology of Vertebrates.

This course deals with the principles of embryological science as illustrated by the development of vertebrates. The work is based on the development of the chick, but comparisons are made with other forms, both vertebrate and invertebrate. Considerable attention is paid to embryological technique. Students electing this course are expected to have some knowledge of vertebrate anatomy, histology, and physiology.

Physiological Zoölogy.

A course in the general physiology of animals, dealing with the processes occurring in living matter. The course is intended to lay a basis for an understanding of modern experimental work in the field, and of the theories based upon it, as well as to serve as an introduction to courses in the special physiology of man. The course on the Elements of Animal Biology, or a satisfactory equivalent, is prerequisite.

Zoölogical Investigation.

Work to be arranged.

Zoölogical Seminar.

The work of the Seminar will be based on Driesch's "*The Science and Philosophy of the Organism.*"

Dr. CASTEEL:—

Evolution of Heredity.

A course of illustrated lectures, of readings and conferences dealing with the fundamental problems of biology. Among other topics the following will be considered: Evidence of organic evolution; factors and theories to explain evolution; evolution of man; variation and heredity in relation to each other and to the evolution problem; the physical basis of heredity; inheritance of mental and physical traits in man; heredity and disease; heredity and environment; experimental animal breeding; theories and laws of heredity. The course will be made as non-technical as possible to fit the needs of the general as well as the special student in biology.

Dr. CASTEEL and Dr. HEGNER:—

Invertebrate Zoölogy.

Part 1. The structure, classification, distribution and activities of invertebrate animals exclusive of the Arthropods. Part 2. The Arthropods with special reference to the Insects. This course is planned to accommodate those who desire a wider and more comprehensive knowledge of invertebrate animals than can be presented in Course 1. It should be preceded by Course 1 or an equivalent, since the work of that course is used as a basis for a more extended view of the invertebrate field. All groups of invertebrates are considered. The last three weeks of the course are devoted exclusively to entomology, the work at this time consisting largely of field trips and study and identification in the laboratory, of insects collected by the students themselves.

Dr. HEGNER:—

The Birds and Mammals of Michigan.

This course treats of the birds and mammals of Michigan, their classification, habits, life histories, economic importance, preservation, and propagation. Special emphasis will be laid upon field work. Teachers in public schools will find this course valuable as a basis for the teaching of nature study.

Students are requested to communicate with the members of the staff as early as possible concerning the above courses offered during the Summer Session.

BOTANY

The work in botany in this University is divisible into morphology, physiology, ecology, and plant-breeding. For the study of these branches there are especially equipped rooms with a large amount of general and special apparatus. New apparatus is purchased or constructed as it may be needed in investigation. In the

laboratory is shelved a working library, including the leading domestic and foreign journals and ample facilities for tracing the literature of any subject.

The herbarium contains 90,000 specimens, being especially rich in algae and economic fungi. The University Botanical Garden and Arboretum now being planted, adjacent plant houses, and woods, fields, swamps, and waters furnish material for study and opportunity for experiment.

To be admitted to graduate work, a student must have pursued the collegiate study of botany for at least a year. A minor in botany for the master's degree will not include research; but a major in botany for the master's degree may include research, or may be taken wholly in courses, according to the preparation and the needs of the candidate. In any case the candidate receives special supervision and direction from the instructor. For the doctor's degree, a minor in botany will be approximately equivalent to a major for the master's degree. The requirements for a major are to be found elsewhere in this Announcement. (See page 15.)

Academic Session, 1909-1910

A. FOR GRADUATES AND UNDERGRADUATES

The equivalent of a full year in the collegiate study of botany is required for admission to any of the courses named below.

Professor NEWCOMBE:—

Reproduction and Embryology of Flowering Plants.

One lecture and *four hours laboratory work a week, first semester.*

General Morphology and Physiology.

Cell structure, tissue structure, and organography; the cell theory, mitosis, heredity; practice in technique. Lectures and laboratory work.—*Five credit hours a week, first semester.*

Experimental Physiology of Plants.

A laboratory and outdoor study of the relation of plants to their environment, as manifested by the phenomena of nutrition, growth, and irritability. This work is divided into two courses: the more elementary course is given the *second semester*, and may be followed in the *first semester* of the next year by the more advanced course which is preparatory to research. Lectures and laboratory work.—*Five or more credit hours a week, throughout the year.*

Teachers' Course.

Conference and reports on books, apparatus and material for high school laboratories; practical methods for collecting and preserving material and conducting field observations; preparation of outlines of courses for secondary schools.—*Two credit hours a week, first semester.*

Assistant Professor POLLOCK:—

Morphology and Classification of Fungi.

Three credit hours a week, first semester.

Plant Pathology.

A study of the structure, habits, and life history of leading groups of fungi, with special attention to those determining pathological conditions of cultivated plants. Sufficient time will also be given to bacteria and other pathological agents to secure a foundation for independent work in this direction. Lectures and laboratory work.—*Three credit hours a week, second semester.*

Assistant Professor BURNS:—

Biological Relations of Plants.

Lectures, with reviews of recent literature on ecology and distribution, accompanied by field studies of habits and adaptations, and laboratory work on ecological anatomy. *Two credit hours a week, first semester.* By permission, students who are prepared to take up special problems may elect this course as *three or more hours.*

Ecology.

A study of the habits and adaptation of plants. The floras of mills and valleys, of morainal lakes, bogs and swamps, and the Huron river in the vicinity of Ann Arbor afford part of the material and topics for this course. Lectures with field work and reports.—*Two or more credit hours a week, second semester.*

Botanical Survey of the Huron Valley.

A limited number of students will be given opportunity to take part in a systematic study of the local flora.—*Two or more credit hours a week, second semester.*

Anatomy of Trees.

Comparative anatomy of trees with relation to age and habitat. Reading and laboratory work.—*Two or more credit hours, throughout the year.*

Dr. KAUFFMAN:—

Morphology, Physiology, and Classification of the Algae and Fungi.

Lectures and laboratory work.—*Two credit hours a week, first semester.*

Morphology, Physiology, and Classification of Liverworts, Mosses and Ferns.

Lectures and laboratory work.—*Three credit hours a week, second semester.*

Classification and Local Distribution of Flowering Plants.

Lectures and laboratory work.—*Three credit hours a week, second semester.*

Dr. HUS:—

Plant Culture and Breeding.

Foundation for a knowledge of the modern science and art of plant culture and breeding, including the propagation of varieties by selection, budding, grafting, cross-fertilization, and hybridizing. Lectures and laboratory work.—*Three credit hours a week, first semester.*

Plant Variation and Breeding. Advanced Course.

Lectures, reading, demonstrations, and practical field work.—*Three or six credit hours a week, second semester.*

Current Literature of Horticulture and Plant-Breeding.

Preparation of papers and discussions.—*One credit hour a week, throughout the year.*

The BOTANICAL FACULTY:—

Current Literature of Botany.

Meetings of instructors and advanced students are held once a fortnight throughout the year, at which reports of original work and reviews of important contributions to botanical literature are made.

Biological Problems and Theories.

This course consists of one lecture a week during the second semester on current problems and theories in biology, such as the origin of life, heredity, morphogenesis, mutation, inheritance in hybrids, mechanism and vitalism, senescence and death.

B. PRIMARILY FOR GRADUATES

Professor NEWCOMBE:—

Investigations in Physiology and Cytology.

Problems in plant nutrition, growth, irritability, reproduction, cell division, and cell physiology.

Assistant Professor POLLOCK:—

Investigations in the Morphology and Physiology of Fungi and in Plant Pathology.

Assistant Professor BURNS:—

Investigations in Ecology and Experimental Morphology.

Problems in field and laboratory work.

Dr. KAUFFMAN:—

Investigation in Physiology of Reproduction.

Dr. HUS:—

Investigations in Plant-Breeding.

Anyone planning investigation in breeding with the higher plants should expect to remain at the University for at least one summer, in addition to attendance in the regular session.

Summer Session, 1909

Graduate students of this and other approved institutions competent to enroll for a higher degree will be afforded an opportunity to do work in botany along the lines best suited to their needs. Such work, when satisfactorily completed, will be accepted as a fulfillment of the requirement for such degree. In order to secure the master's degree in summer school the student should devote one-half his time for four summers (16 hours) to graduate work in botany, for a major or one-fourth this for a minor. The courses outlined below offer an opportunity for fulfilling these conditions.

FOR GRADUATES AND UNDERGRADUATES

Assistant Professor POLLOCK:—

Plant Disease.

The aim of this course is to make the student familiar with some of the more common diseases of plants which are caused by other plant agencies, Bacteria, Fungi, etc. The diseased plants will be studied with reference to the changes in structure

or function produced by the disease; that is, the general pathological condition, and the organisms which cause the disease will be studied with reference to their life history and the conditions under which they develop. Methods of making culture media and obtaining pure cultures of organisms that cause disease will be studied. Field excursions will be made, to collect specimens of diseased plants and to observe them in their natural habitat. This material will be taken to the laboratory for identification. A part of the work will consist in the inoculation of healthy plants with disease-producing germs, and watching the progress of the disease. Laboratory work eight hours per week for two hours credit, and twelve hours per week for four hours credit, between 9 and 12. Besides the laboratory work, some collection and identification of material must be done for the four hours credit. This collection must be done afternoons or Saturdays. Laboratory fee, \$2.00 or \$4.00.

Assistant Professor BURNS:—

Advanced Course in Ecology.

This course will treat of the geographical distribution of plants, and the relation of plant societies to the physiographic development of the various land forms. It is specially designed to show the result of continuous physiographic change upon plant distribution, and the consequent shifting of plant societies. The course must be preceded or accompanied by Course 2. Lectures and field work.

PRIMARILY FOR GRADUATES

Assistant Professor POLLOCK:—

Research in Plant Pathology.

Opportunity will be afforded for competent students to undertake work along the line of special problems in plant disease.

Research in Plant Physiology.

Problems in growth, nutrition, reproduction, and sensitive reaction.

Assistant Professor BURNS:—

Research in Ecology.

Special problems will be given to advanced students. An effort will be made to take up problems which may be farther studied by the student in any locality. This course is open only to those who receive special permission from the instructor.

[Beginning in the year 1910, it is hoped to offer each summer opportunity for research in plant-breeding.]

FORESTRY

The courses in forestry are open only to forestry students, except the Introduction to Forestry, which is open to other students by special permission.

Forestry students are those who are working toward the degree of Master of Science in Forestry; or candidates for the doctorate (Doctor of Philosophy or Doctor of Science), one or both of whose minors are in forestry.

Of the students who are working toward the degree of Master of Science in Forestry, there are two general classes: (1) Those who enter this University as undergraduates with the purpose of studying forestry. Such students are expected to take the degree of Bachelor of Arts at the end of their fourth year of college work, and the degree of Master of Science in Forestry at the end of the fifth year. The Introduction to Forestry is taken by these students in their junior year, the other forestry courses in their senior and graduate years. (2) Those who begin the study of forestry as graduate students. Such students require two years to complete the course in forestry and receive the degree of Master of Science in Forestry.

Academic Session, 1909-1910

Professor ROTH:—

Introduction to Forestry.

Lectures. A general presentation of the subject, its history, object and methods, as well as economic importance.—*Four hours a week, second semester.*

Forest Utilization.

Lectures. Use of timber; points of production and market; methods of lumbering, milling and marketing; minor forest industries.—*Four hours a week, first semester.*

Forest Management.

Lectures and field work. General forest survey and preparation of working plans; administration and regulation of the field and office work in the care of a large tract of timber and the methods of calculation involved in judging the value of forests and forest operations.—*Four hours a week, throughout the year.*

Professors ROTH and MULFORD.

Forestry Seminary.

Special treatment of selected topics.—*Two or three hours a week through the year to the spring vacation. No credit allowed.*

Professor MULFORD:—

Silviculture.

Lectures and field work. The course continues through three semesters and should be taken in the following order:

(a) Introductory, including forest description; the study of soil, climate and other site factors, with their influence on forest growth; influences exerted by the forest upon climate, stream flow, soil, etc.—*Three hours a week, first semester.*

(b) Artificial and natural reproduction of forests; afforestation.—*Three hours a week, second semester.*

(c) Care of forests, including thinning; protection of forests against fire and other enemies.—*Three hours a week, first semester.*

Mensuration.

Lectures, laboratory and field work. Methods of measuring the volume of the individual tree and of entire stands of timber; timber estimating; study of the rate of growth and yield of individual trees and of entire stands; rough methods of forest survey.—*Three hours a week, throughout the year.*

Dendrology.

Lectures, laboratory and field work. Monographic study of forest tree species, their classification, identification, distribution, life history, requirements, behavior in the forest, and importance; forest regions.—*Three hours a week, second semester.*

ANATOMY AND HISTOLOGY

Academic Session, 1909-1910

Professors HUBER and STREETER:—

Anatomy of the Central Nervous System; a. Comparative,
b. Human.

This course consists of a detailed study of the structure of the central nervous system, and is open to students who have the requisite preliminary training.—*Three hours, first or second semester.*

Anatomy and Histology of the Special Sense Organs.

Open to students who have already taken a course in General Biology.—*Hours to be arranged with the instructor, throughout the year.*

Research.

Anatomy, Human Embryology, and Histology. This work is open to students who have had the necessary preliminary training.—*Hours to be arranged with the instructors, throughout the year.*

PHYSIOLOGY

Advanced work in physiology presupposes knowledge of the general anatomy of man or some other vertebrate, histology, and the elements of physics and chemistry. It is also desirable that the student should have had a course in general biology, and should be able to read French and German.

The requirement for a minor for the master's degree is five hours of lectures the first semester, four hours the second semester, a laboratory course of five afternoons a week for eight weeks, and a report on the literature of some limited subject. The four-hour lecture course given in the second semester should be taken before the five-hour course on the first semester. No research work will be required, except from those who have already taken advanced work in physiology. The requirement for a major for the master's degree includes, in addition to the requirement for the minor, research work during half of one semester, performed under direction.

The requirement for a minor for a doctor's degree involves about as much work as that for a major for the master's degree, the character of the work being determined by the previous training and needs of the candidate. The requirement for a major for the doctor's degree is not only the knowledge of physiology to be obtained by study of the most advanced text-books, but familiarity with the history and current literature of the subject, and a thesis reporting the results of original investigation. It is probable that at least a year would have to be devoted to research.

The following subjects may be suggested as suitable for minors for those selecting physiology for a major:—anatomy, histology, physiological chemistry, physiological psychology, animal morphology, bacteriology, physiological botany, physical chemistry.

The laboratory is well equipped with apparatus for all ordinary forms of research, and has a shop containing the tools required for making models and the simpler forms of apparatus. The University work shop permits the construction of special apparatus required for research under the direction of the investigator. The medical library contains, besides a large number of monographs, etc., complete sets of all the more important journals of physiology and allied subjects.

Academic Session, 1909-1910**Professor LOMBARD:—****Lecture Course.**

Five hours a week, first semester; four hours a week, second semester.

Laboratory Course.

Fifteen hours a week, half of one semester.

Research Work.

Hours to be arranged with instructor.

BACTERIOLOGY, HYGIENE, PHYSIOLOGICAL CHEMISTRY

The courses here announced presuppose that the student taking them is prepared for original research.

Academic Session, 1909-1910**Professor VAUGHAN:—****Food Analysis.****Water Analysis.****Research on the Chemistry of Bacteria.**

Students doing graduate work in these subjects will be required to work in each subject for at least one year.

Professor Novy:—**Special Methods in Bacteriology.**

A course in advanced laboratory work in bacteriology. It deals with the preparation and use of Pasteur pipettes, the drawing of blood, the collection and sterilization of serum, the filtration of bacterial liquids, the preparation of tuberculin, tetanus, and diphtheria toxins, the preparation of antitoxic and anti-infectious sera, serum, reactions, the determination of the thermal death-point, of the action of antiseptics and disinfectants, the detection of bacteria in sections, the collodium sac method, inoculation for rabies, etc. The student, when qualified, is assigned special problems for investigation and research.

The course must be preceded by Courses 2 and 3, described in the University Calendar for 1908-1909.—It is given in the first half of the second semester.

Pathogenic Protozoa.

The work in protozoology is given in the second half of the second semester and follows Course 1, which must precede it. Special attention is given to the study of the blood parasites, such as trypanosomes, plasmodia, piroplasmies, hemogregarines, etc. The spirochetes are also taken up in this course. As far as practicable infected animals are provided for the student and an opportunity is given to do experimental work with insect hosts, as mosquitoes, ticks, etc.

Research in Bacteriology and Protozoology.

Advanced Physiological Chemistry.

Laboratory work and reading.—*Second semester.*

HIGHER DEGREES CONFERRED IN 1908

MASTER OF ARTS

James Howard Agnew, A.B.	Paul Van Brunt Jones, A.B.
Edith Emma Atkins, A.B.	Clyde L. King, A.B.
Willard Titus Barbour, A.B.	Edith Wilmar Kinnan, A.B.
Floyd E. Bartell, A.B., <i>Albion College</i>	Marjorie Kinnan, A. B.
Lawrence Ray Boyer, A.B.	Arthur Charles Klockslem, A.B., <i>German Wallace College;</i>
Gail Luke Carver, A.B.	A.M., <i>ibid</i>
Isaac Merton Cochran, A.B.	Helen Rose Lang, B.L.
Arthur Charles Cole, A.B.	George Allan Lindsay, A.B.
Maynie Rose Curtis, A.B.	Clyde Elton Love, A.B.
Frank William Douglas, A.B., <i>Albion College.</i>	Alice Malone, A.B.
Esson McDowell Gale, A.B.	Burl Garfield Martin, A.B.
Olive May Gilbreath, A.B., <i>Wellesley College</i>	Albert Taylor Mills, Ph.B.
Alexander Charles Gray, A.B., <i>University of Toronto; A.M., Hiram College</i>	Eugene Lyman Porter, A.B., <i>Harvard University</i>
Ottillie Kunigunde Grauer, A. B.	Esther Elizabeth Shaw, A.B., <i>Mount Holyoke College</i>
Minnie Olivia Hall, A.B.	Charles Everett Skinner, B.L.
Grace Angeline Harrington, A.B., <i>Oberlin College</i>	Arthur William Stalker, A.B.
Hildegarde Jend, B.L., <i>German Wallace College</i>	Luella Townley, A.B.
	Frank Van Vliet, A.B.
	Dwight Everett Watkins A.B.
	John Zedler, A.B., <i>Albion College</i>

MASTER OF SCIENCE

Glenn B. Britton, A.B.	Charles Alexander Vallance,
John Edward Tanis, A.B., <i>Kalamazoo College</i>	A.B.

MASTER OF SCIENCE IN FORESTRY

Asa Lee Brower, B.S., <i>Morningside College</i>	Julius Frank Kimmel, A.B.
John Robert Dickson, A.B.	Roy Gifford Pierce, A.B., <i>University of Nebraska</i>
Peter Keplinger, Ph.B., <i>Colorado College</i>	

DOCTOR OF PHILOSOPHY

John Cerenus Bordner, A.B., <i>University of Indiana, 1904; Dexter M. Ferry Fellow in Botany</i>
Botany; Forestry; Analytical Chemistry.
<i>Thesis, The Influence of Constant Longitudinal Traction on the Formation of Mechanical Tissue in Stems</i>

Albert Robinson Crittenden, A.B., 1894; A.M., 1902; *Peter White Classical Fellow*

Latin; Philosophy; Education.

Thesis, Sentence Structure in Virgil

Alvin Eleazer Evans, A.B., *Cotner University*, 1896; A.M., *University of Nebraska*, 1898; *Buhl Classical Fellow*

Latin; Roman Law; Greek.

Thesis, Roman Law in Livy.

Manson Alexander Stewart, A.B., 1903; A.M., 1904

Latin; Greek; Ancient Philosophy.

Thesis, Word Study in Latin Abstracts

HOLDERS OF FELLOWSHIPS, 1908-1909

Arthur William Linton,¹ Ph.G. (*Highland Park College*), *Stearns Fellow in Pharmaceutical Chemistry*

Ray Eli Cleveland, A.B., *Buhl Classical Fellow*

Harriet Rice Congdon, A.B. (*Mount Holyoke College*), *Peter White Classical Fellow*

Henry Mills Gelston, A.B., *Buhl Classical Fellow*

John Nelson Norwood, A.B. (*Alfred University*), *Peter White Fellow in American History*

William Alder Perkins,² *Rockefeller Fellow in Hygiene and Bacteriology*

Charles Bruce Vibbert, A.B., *George S. Morris Fellow in Philosophy*

William Albert Dunkley,³ B.S., *Gas Engineering Fellow*

¹ Registered in the Department of Pharmacy.

² Registered in the Department of Medicine.

³ Registered in the Department of Engineering.

STUDENTS IN THE GRADUATE SCHOOL 1908-1909¹

*Florence Lavinia Abbott, Ph.B., 1899 Mathematics; Physics; English.	<i>Ann Arbor</i>
John Quincy Adams, B.L., 1894, LL.B., 1898 English Oratory; English Drama; English History.	<i>Alma</i>
Herbert Francis Allen, A.B., <i>University of South Dakota</i> , 1905, A.M., <i>ibid.</i> , 1906 English; Rhetoric; German Literature.	<i>Vermillion, S. Dak.</i>
Elizabeth Melvina Andrews, A.B., <i>Le- land Stanford, Jr., University</i> , 1908 Plan B (Mathematics; Education; German).	<i>Corona, Cal.</i>
Bessie Annis, A.B., <i>University of Wash- ington</i> , 1905 Rhetoric; English Literature; Philosophy.	<i>Kennecwick, Wash.</i>
Cornelius K. Baarman, A.B., <i>Hope College</i> , 1903, A.B., 1904 Plan B (Physics; Mathematics).	<i>Zeeland</i>
Grace Mabel Bacon, A.B., <i>Mount Holyoke College</i> , 1901 German Literature; German Philology; English Literature.	<i>Dorchester, Mass.</i>
*Grace Wilder Bailey, Ph.B., Pd.B., <i>Hills- dale College</i> , 1900 Chemistry; Zoology; Physics.	<i>Hillsdale</i>
George Latta Barrus, B.S., <i>University of Rochester</i> , 1906 Forestry; Mechanical Engineering; Botany.	<i>Charlotte, N. Y.</i>
Floyd Earl Bartell, A.B., <i>Albion College</i> , 1905, A.M., 1908 Physical Chemistry; Analytical Chemistry; Mineralogy.	<i>Concord</i>
*William Beachler, B.S., <i>Lebanon Univer- sity</i> , 1888, B.L., <i>Earlham College</i> , 1899 Education; Philosophy; Education.	<i>Decatur, Ind.</i>
*Arthur Emmons Bellis, A.B., 1907 Physics; Mathematics; Electrical Engineering.	<i>Laramie, Wyo.</i>

¹ The subjects of study pursued by candidates for an advanced degree are indicated under their respective names, the subject first named being the major study. If a candidate for a master's degree is pursuing his work under Plan B (see p. 17), his subjects of study are given in parentheses. Unmarked names indicate students enrolled during the academic session of 1908-1909; those with an asterisk (*) were members of the Summer Session of 1908 only; names marked with a dagger (†) indicate students who were enrolled in both the Summer Session of 1908 and the academic session of 1908-1909; (¶) shows that the student was permitted to complete a portion of his studies *in absentia*; names marked with parallels (||) are students who completed their undergraduate course in February, 1909, but will not take their degrees until the following commencement in June; the double dagger (‡) indicates registration in the Department of Medicine and Surgery also.

- *Edith Inez Beman, Ph.B., *Western Reserve University*, 1901 *Cleveland, O.*
Mathematics; Philosophy; Geology.
- John Knight Munroe Berry, A.B., 1901, A.M., 1902 *Detroit*
German Literature; Germanic Literature; Latin.
- Grace Darling Bissell, A.B., 1904 *Ann Arbor*
Rhetoric; Sociology; English.
- Webster Edwin Bliss, A.B., 1908 *Deerfield*
Rhetoric; English Literature; Philosophy.
- *James Irven Bricker, A.B., *Hillsdale College*, 1894 *Saginaw, West Side*
Botany; Plant Ecology; Zoology.
- Harold Prell Breitenbach, A.B., 1901, A.M., 1903 *Ann Arbor*
Rhetoric; Aesthetics; English Literature.
- Harvey Clayton Brill, A.B., *Miami University*, 1908 *Camden, O.*
General Chemistry; Mineralogy; Physical Chemistry.
- Glenn B. Britton, A.B., *Miami University*, 1906, A.B., 1907, M.S., 1908 *Oxford, O.*
General Chemistry; Physical Chemistry; Mineralogy.
- |Heartie Earle Brown, A.B. *East Lansing*
English; Rhetoric; Education.
- Loretta Agatha Brown, A.B., 1905 *Port Huron*
German; English; American History.
- Louise Marie Hubbard Bruner, A.B., *Oberlin College*, 1906 *Port Byron, Ill.*
Botany; Plant Physiology; Classical Archaeology.
- *Charles Winfield Burchard, A.B., *Allegheny College*, 1908 *Guys Mills, Pa.*
General and Physical Chemistry; Physics; Mathematics.
- Minnie Antoinette Burgoyne, A.B., 1909 *Bridgeport*
Plan B (History and English).
- Philip Everette Bursley, A.B., 1902 *Fort Wayne, Ind.*
French; English History.
- *Karl George Adolf Busch, B.S., *Capital University (Columbus, O.)*, 1903, A.B., *ibid.*, 1904 *Woodville, O.*
German Literature; German Philology; English Literature.
- *Harvey Blaine Campbell, B.S., 1907 *Louisville, Ky.*
Physics; Chemistry.
- Robert John Carney, A.B., 1907 *Sturgis*
Analytical Chemistry; Organic Chemistry; Physics.
- *Jesse Bryant Carpenter, A.B., 1902 *Louisville, Ky.*
Latin; Greek; German.
- *Laura Augusta Carpenter, A.B., 1897 *Muskegon*
Plan B (Education).
- †Earl William Castle, A.B., 1907 *Ann Arbor*
Astronomy; Mathematics; Insurance.
- †William Dean Chadwick, A.B., *Marietta College*, 1905 *Albion*
Plan B (English Literature; Rhetoric).

- Clara Abigail Chase, A.B., 1902 *Ann Arbor*
English Literature; Rhetoric; English Philology.
- Chen Wei Cheng, A.B., *Peking University*
(*Peking, China*), 1896, A.M., *ibid.*,
1907 *Peking, China*
European History; International Law; Political Economy.
- *Lola Cherrington, B.S., *Rio Grande Col-*
lege, 1899 *Wellston, O.*
Botany; Mineralogy; Zoology.
- *Charles Atwood Clay, B.S., *Central Col-*
lege (Ubee, Ind.), 1907 *Huntington, Ind.*
Geology; Physics; Chemistry.
- Henry Ward Church, A.B., 1908 *Saint Joseph*
German Literature; German Philology; French.
- Harold Charles Clark, B.S., *Dartmouth*
College, 1908 *Keene, N. H.*
Forest Management; Silviculture; Forest Utilization.
- Ray Eli Cleveland, A.B., *State University*
of Iowa, 1906 *Cedar Falls, Ia.*
Latin; Greek; Ancient Philosophy.
- ||Alice Marie Coats *Detroit*
Plan B (English Literature; History).
- John Lewis Cobbs, Jr., A.B., *University of*
the South, 1907 *Montgomery, Ala.*
Forest Management; Silviculture; Botany.
- Harry Newton Cole, A.B., 1901, B. S.
(Ch.E.), 1906 *Ann Arbor*
Metallurgy; Physics; Chemical Technology.
- Harriet Rice Congdon, A.B., *Mount Hol-*
yoke College, 1898 *Rochester, N. Y.*
Greek; Latin; Philosophy.
- †Guy Conrey, A.B., 1908 *Anita, Ia.*
Physical Chemistry; Organic Chemistry; Physics.
- Charles Wilford Cook, A.B., 1904, M.S.,
1906 *Fenton*
Mineralogy; Chemistry; Geology.
- Irwin Wycliffe Cook, B.S., *Washburn Col-*
lege, 1907 *Oberlin, Kan.*
Forest Management; Silviculture; Forest Mensuration.
- Leigh Guillot Cooper, A.B., 1904 *Detroit*
American History; Economics; Political Science.
- Robert Craig, Jr., B.S., *Alma College*, 1908 *Sault Ste. Marie*
Forest Management; Silviculture; Forest Mensuration.
- *Clayton Archie Crandall, A.B., 1908 *Union City*
Plan B (Botany, Physics).
- Nellie Stewart Cronkhite, A.B., 1905 *Flint.*
- *D. Wilson Crouse, A.B., *Wittenberg Col-*
lege, 1900, A.M., *ibid.*, 1907 *Atchison, Kan.*
Physics; Electrical Engineering; Mathematics.
- *Frances Norton Curry, Ph.B., *University*
of Wooster, 1901 *Ann Arbor*
German Literature; German Philology; Education.

- †Ralph Emerson Danforth, A.B., 1908 *Westfield, N. J.*
Botany; Forest Mensuration; Silviculture.
- *Ralph Darner, A.B., *Wittenberg College*,
1905, A.M., *ibid.*, 1908 *Springfield, O.*
Physical Chemistry; Organic Chemistry; Mineralogy.
- †Wirt Edward Darrow *Ann Arbor*
Physics; Mathematics; Political Economy.
- John William DeBruyn, A.B., 1907 *Holland*
Sociology; Psychology; European History.
- †Herbert Fletcher DeCou, A.B., 1888, *Chicago, Ill.*
A.M., 1890
Greek; Latin; Italic Dialects.
- Howard de Forest, B.S., *Princeton University*, 1895. *New York, N. Y.*
Forest Management; Silviculture; Forest Mensuration.
- Henry Walstane de Nancrede, A.B., 1908 *Ann Arbor*
Forest Management; Silviculture; Forest Utilization.
- George Bion Denton, A.B., 1907 *Detroit*
European History; Rhetoric; Psychology.
- Ralph Devries, B.S. (E.E.), 1907 *Holland*
Physics; Mathematics; Astronomy.
- Richard de Zeeuw, A.B., *Hope College*,
1906, A. B., 1908 *Sioux Center, Ia.*
Botany; Plant Pathology; Zoology.
- †Andrew Jackson Dighton *Monticello, Ill.*
Romance Languages; Romance Literature; English Literature.
- Harriette May Dilla, A.B., 1908 *Ann Arbor*
Government; International Law; American Constitutional History.
- Robert James Dobson, A.B., *Albion College*, 1907 *Ann Arbor*
Physics; Chemistry; Mathematics.
- †Floyd Carlton Dockeray, A.B., 1907 *Ann Arbor*
Psychology; History of Philosophy; Sociology.
- *Frank William Douglas, A.B., *Albion College*, 1905 *Albion*
Metallurgy; Hygiene; Physics.
- Gayle Albert Dull, A.B., 1908 *Stratford, Ont.*
- Clara Belle Dunn, A.B., 1904 *Ann Arbor*
Rhetoric; English Literature; German.
- George Argo Duthie, A.B., 1908 *Grand Rapids*
Forest Management; Silviculture; Forest Mensuration.
- †William Duvén, A.B., *Hope College*, 1908 *Brandon, Wis.*
Botany; Plant Physiology; Chemistry.
- *Sheridan Williams Ehrman, B.L., 1896 *Decatur, Ill.*
Education; Philosophy; Sociology.
- Lucius Walter Elder, A.B., 1905 *Ann Arbor*
History of Modern Philosophy; Metaphysics; English.
- Alfred Lynn Ferguson, A.B., 1908 *Ann Arbor*
Physical Chemistry; Physics; Philosophy.
- *Frank Alexander Ferguson, A.B., 1908 *Alliance, O.*
Physics; Mathematics; Chemistry.
- Robert Trevor Ferguson, B.S., *Washington and Jefferson College*, 1908 *Washington, Pa.*
Forest Management; Silviculture; Dendrology.

- *William Andrew Ferguson, A.B., 1904 *Traverse City*
Physics; Analytical Chemistry; Mathematics.
- Charles Ney Filson, A.B., *Bethany College*, 1908 *Bethany, W. Va.*
European History; Philosophy of Religion; Sociology.
- Hortense Flexner, A.B., 1907 *Louisville, Ky.*
Rhetoric; German; Sociology.
- Earle R. Forrest, B.S., *Washington and Jefferson College*, 1908 *Washington, Pa.*
Forest Management; Silviculture; Dendrology.
- *Lewis Lovatus Forsythe, A.B., 1904 *Saint Louis*
History of Education; Educational Administration; Latin.
- *Charles Smalley Foster, A. B. A.M., *Antioch College*, 1906 *Fletcher, O.*
English; Rhetoric; Aesthetics.
- *Elbertie Foudray, B.S., *Northwestern University*, 1903 *Wyandotte*
Physics; Mathematics; Chemistry.
- David Friday, A.B., 1908 *Ann Arbor*
Political Economy; Sociology; American History.
- *Dorothy Fuerstenau, A.B., 1907 *Saginaw*
Plan B (German Literature; Latin).
- †James Edwin Fulcher, C.E., *University of Missouri*, 1886 *Ann Arbor*
Physics; Astronomy; Geology.
- Earl Garfield Fuller, A.B., 1908 *Ravenna*
American History; International Law; Political Economy.
- *Edward Everett Gallup, A.B., 1906 *Chelsea*
History of Education; Sociology; Psychology.
- William Van Nest Garretson, B.S., *Rutger's College*, 1902, M.S., *Yale University*, 1904 *Ann Arbor*
Pure Mathematics; Mechanics; Astronomy.
- Henry Mills Gelston, A.B., 1900 *Ann Arbor*
Latin; Greek; Ancient Philosophy.
- *Flora Belle George, B.L., *Ohio Wesleyan University*, 1894 *Toledo, O.*
English; Philosophy; Rhetoric.
- †Quinter Olen Gilbert, A.B., 1909 *Grundy Center, Ia.*
Zoology; Neurology; Bacteriology.
- Olive May Gilbreath, A.B., *Wellesley College*, 1906, A.M., 1908 *La Plata, Mo.*
Rhetoric; English; Philosophy.
- Solomon Francis Gingerich, A.B., *Indiana University*, 1905, A.M., *ibid.*, 1907 *Goshen, Ind.*
English; Rhetoric; Aesthetics.
- *Henry Newell Goddard, Ph.B., 1893 *Waukesha, Wis.*
Plan B (Botany).
- *Edna Grant, A.B., *Oberlin College*, 1904, A.M., 1906 *Cleveland, O.*
English Literature; Aesthetics; Rhetoric.

- *Alexander Charles Gray, A.B., *University of Toronto*, 1896, A.M., *Hiram College*, 1897
American History; Sociology; Ethics. *Eureka, Ill.*
- ||Ruth Curtis Greathouse
Bacteriology; Organic Chemistry; Greek. *Washington, D. C.*
- Clarence Wilson Greene, A.B., 1903, A.M., 1905
Physics; Mathematics; Electrical Engineering. *Albion*
- Charles Edward Griffin, A.B., *University of Denver*, 1902
Analytical Chemistry; Chemical Technology; Electrical Engineering. *Brighton, Colo.*
- George Andrew Gutches, B.S., *Hobart College*, 1906
Forest Management; Silviculture; Forest Mensuration. *Coldwater*
- Arthur Hamilton, A.B., *Harvard University*, 1907
French; Spanish; Italian. *Fort Wayne, Ind.*
- Herbert Aaron Hard, B.S., *Ohio Wesleyan University*, 1897
General and Physical Chemistry; Analytical Chemistry; Geology. *Ann Arbor*
- Ivan Frederick Harlow, A.B., 1908
Organic Chemistry; Chemical Technology; Physics. *Ann Arbor*
- †James Elmer Harris, A.B., 1908
Physical Chemistry; Organic Chemistry; Physics. *Bay City*
- †Wilmer Carlyle Harris, Ph.B., *University of Chicago*, 1904
American History; English History; Government. *Ann Arbor*
- ||Lucia Caroline Harrison
Physiography; Mineralogy; American History. *Saginaw*
- *William Henry Hart, A.B., *Albion College*, 1904
Education; Philosophy; Education. *Princeton*
- *Ernest Clark Hartwell, A.B., *Albion College*, 1905
Political Economy; American History; Sociology. *Petoskey*
- Wilmot W. Glidden Hastings, A.B., *Clark University*, 1908
Forest Management; Silviculture; Forest Mensuration. *Montrose, Pa.*
- Edward William Headsten, A.B., 1908
Forest Management; Silviculture; Forest Mensuration. *Escanaba*
- Charles Augustus Heiss, A.B., *George Washington University*, 1908
Political Economy; Finance; German. *Washington, D. C.*
- Ada May Herr, A.B., *Southwestern College (Kansas)*, 1907
Plan B (American History; Sociology). *Krowa, Kan.*
- *Rose May Crandall Hess, Ph.B., 1898
German Literature; German Philology; Latin. *Traverse City*
- Martha Hill, A.B., *Western College for Women*, 1906
Plan B (Botany; German). *Madison, Ind.*

- Mary Taylor Hill A.B., *Western College for Women*, 1908 *Madison, Ind.*
 Latin; German; Roman Political Institutions.
- *Frances Powell Hooper, Ph.B., *University of Mississippi*, 1885 *Columbus, Miss.*
 Plant Ecology; Plant Physiology; Zoology.
- ||Arthur Sherwood Hopkins *Rome, N. Y.*
 Forest Management; Silviculture; Forest Mensuration.
- †Louis Allen Hopkins, A.B., *Butler College*, 1905, M.S., *University of Chicago*, 1906 *Ann Arbor*
 Pure Mathematics; Theoretical Applied Mathematics; Astronomy.
- Harry Garfield Houghton, A.B., 1906 *Oak Grove*
 Oratory; English; Rhetoric.
- Harry Hale Howett, Ph.B., *Antioch College*, 1904 *Osborn, O.*
 American History; English; Education.
- Walter Fred Hunt, A.B., 1904, A.M., 1905 *Ann Arbor*
 Mineralogy; Analytical Chemistry; Geology.
- Fred Walter Hunter, B.S., *University of Rochester*, 1907 *Rochester, N. Y.*
 Physical Chemistry; Organic Chemistry; Food Analysis.
- *Frank C. Janes, B.S., *Albion College*, 1898 *Williamston*
 Plan B (Education).
- †Jessie Gertrude Jennings, A.B., 1901, A.M., 1902 *Pontiac*
 English Literature; German.
- †Gertrude Marie Johnston, Ph.B., *University of Vermont*, 1906 *Ann Arbor*
 German; French; English Literature.
- Paul Van Brunt Jones, A.B., 1906, A.M., 1908 *Ann Arbor*
 European History; American History; English Literature.
- Ernest Victor Jotter, A.B., 1908 *Monroe, O.*
 Forest Management; Silviculture; Forest Utilization.
- †Emanuel Kahn, A.B., *University of Cincinnati*, 1901 *Grand Rapids*
 Sociology; Ethics; Philosophy of Religion.
- *Louis Ward Keeler, Ph.B., 1900 *Michigan City, Ind.*
 History of Education; Philosophy; Psychology.
- *Alfred Kenngott, *University of Zürich* *Saginaw*
 German Literature; German Philology; French Literature.
- Herbert Alden Kenyon, A.B., *Brown University*, 1904, A.M., *ibid*, 1905 *Ann Arbor*
 Romance Literature; Romance Philology; English Literature.
- Virgil Morrison Kime, A.B., 1906 *Ann Arbor*
 Political Economy; Accounts; Insurance.
- Ella Louise King, A.B., *Olivet College*, 1905 *Olivet*
 Plan B (English; Rhetoric).
- Frederica Dorothy Klingmann, A.B., 1908 *Ann Arbor*

- Arthur Charles Klockslem, A.B., *German*
Wallace College, 1898, A.M., *ibid*,
 1899; A.M., 1908 *Cleveland, O.*
 German Literature; Germanic Philology; English Literature.
- *Carrie Krell *Chelsea*
 Plan B (English Literature; German).
- *Erna Kruckemeyer, A.B., *University of*
Cincinnati, 1903 *Cincinnati, O.*
 Plan B (Latin).
- †Lucas Petrou Kyriakides, A.B., 1907 *Broussa, Turkey*
 Organic Chemistry; Physical Chemistry; Physics.
- Jessie Cogswell Laird, A.B., *Mount Holyoke*
College, 1906 *Ypsilanti*
 Plan B (German).
- Elmer S. Lake, A.B., *University of Illinois*,
 1907 *Athens, Ill.*
 Latin; English; Education.
- *Helen Rose Lang, B.L., 1900 *Indianapolis, Ind.*
 Aesthetics; German; English History.
- Edward Henry Lauer, A.B. 1906 *Peru, Ill.*
 German Literature; Germanic Philology; English Philology.
- *Dean Lawrence, A.B., 1903 *Alpena*
 American History; European History; Sociology.
- Sterling Andrus Leonard, A.B., 1908 *Dallas Center, Ia.*
 Rhetoric; Aesthetics; German.
- Mary Delia Lewis, A.B., *Smith College*,
 1894 *Worcester, Mass.*
 Rhetoric; English; Greek.
- *George Allan Lindsay, A.B., 1895 *Saint Louis, Mo.*
 Physics; Mathematics; Astronomy.
- *Fred Aaron Loew, B.S., *Central College*
(Indiana), 1902, B.S., *Michigan Agri-*
cultural College, 1904. *Ubee, Ind.*
 Botany; Mycology; Mineralogy.
- Clyde Elton Love, A.B., 1905, A.M., 1908 *Ann Arbor*
 Mathematics; Mathematical Physics; Theoretical Astronomy.
- George Washington Lyons, B.S., *University*
of California, 1907 *Ballard, Cal.*
 Forest Management; Silviculture; Forest Mensuration.
- †Donald P. McAlpine, A.B., *Lombard Col-*
lege, 1901 *Brooklyn*
 Education; English; Psychology.
- *Arthur Louis McCarty, A.B., 1908 *Huntertown, Ind.*
 Mathematics; Physics; Education.
- *John James McElree, A.B., *Westminster*
College, 1890 *New Wilmington, Pa.*
 Latin; Greek; Roman Political Institutions.
- Carroll Brown Malone, A.B., *Western Re-*
serve University, 1908 *Cleveland, O.*
 European History; English; Sociology.
- *La Verne Bidwell Mann, A.B., *Olivet*
College, 1901 *Detroit*
 Physics; Chemistry; Electrical Engineering.
- ||Carl Eugene Marquardt *Saint Joseph*
 German Literature; Germanic Philology; French Literature.

- ||Ernest Jones Marshall *Baltimore, Md.*
 Chemistry; Microscopy; Hygiene.
- Pauline Martin, A.B., *Olivet College*, 1903 *Ann Arbor*
 German Literature; Germanic Philology; American History.
- Donald Maxwell Matthews, A.B., 1908 *Orange, N. J.*
 Forest Management; Silviculture; Forest Mensuration.
- Frank John Mellencamp, A.B., 1903, A.M.,
 1906 *Ann Arbor*
 Physics; Physical Chemistry; Mathematics.
- *William Orville Mendenhall, A.B., *Penn*
College, 1900, A.M., *ibid.*, 1901, A.B.,
Haverford College, 1901 *Earlham, Ind.*
 Mathematics; Insurance; Astronomy.
- Herma Louise Meyer, A.B., 1908 *Lincoln, Ill.*
 German; French; Education.
- Hattie Lindsay Middaugh, A.B., 1908 *Cameron, Mo.*
 Latin; Roman Political Institutions; English.
- *Emerson Romeo Miller, B.S., 1894, M.S.,
 1895 *Auburn, Ala.*
 Organic Chemistry; Pharmacognosy; Plant Physiology.
- *Harold Alexander Millican, A.B., *Green-*
ville College, 1906 *Spring Arbor*
 Botany; Zoology; Ecology.
- Ina Annette Milroy, Ph.D., *University of*
Berlin, 1904 *Ann Arbor*
- Nellie Amanda Montgomery, A.B., *Hills-*
dale College, 1897 *Hillsdale*
 Latin; German; Roman Political Institutions.
- William Daniel Moriarty, A.B., 1904,
 A.M., 1905 *Ann Arbor*
 Rhetoric; English; Aesthetics.
- William West Morris, A.B., 1908 *Chicago, Ill.*
 Forest Management; Silviculture; Forest Mensuration.
- Chester Birney Morse, A.B., *Ripon Col-*
lege, 1905 *Saint Anthony, Idaho*
 Forest Management; Silviculture; Forest Mensuration.
- Charles Allen Mummart, A.B., *Central Col-*
lege (Indiana), 1907, B.D., *ibid.*, 1908 *Huntington, Ind.*
 Plan B (Semitics; Philosophy).
- Seaton Anderson Norcross, Ph.B., *Adrian*
College, 1903, A.B., 1907 *Ann Arbor*
- John Nelson Norwood, Ph.B., *Alfred Uni-*
versity, 1906 *Madison, Wis.*
 American History; European History; Government.
- †Charles Walter Obee, Ph.B., *Adrian Col-*
lege, 1906, A.M., *ibid.*, 1908 *Ann Arbor*
 Plan B (Zoology).
- *Christine Ortli, A.B., *Western Reserve*
University, 1906 *Cleveland, O.*
 General Chemistry; Analytical Chemistry; History.
- Mahlon Ellsworth Olsen, A.B., 1905, A.M.,
 1906 *Battle Creek*
 Rhetoric; English; Aesthetics.

- Grace Amanda Osborne, A.B., 1906 *Mancelona*
English; Rhetoric; American History.
- Waldo Disraeli Parker, A.B., *Clark University*, 1905 *Worcester, Mass.*
Insurance; Mathematics; Political Economy.
- Carl Eugene Parry, A.B., 1905, A.M., 1907 *Ann Arbor*
Political Economy; Sociology; European History.
- ‡Max Minor Peet, A.B., 1908 *Iosco*
Zoology; Bacteriology; Zoology.
- †Leigh H. Pennington, A.B., 1907 *Ann Arbor*
Physiology; Mycology; Organic Chemistry.
- Charles Milton Perry, A.B., *Albion College*, 1900 *Coldwater*
Philosophy; Metaphysics; Economics.
- Hermon Carleton Pitton, B.S., *Union College (Nebraska)*, 1904 *Stanton*
American History; International Law; Political Economy.
- Vincent Collins Poor, A.B., *University of Kansas*, 1901, M.S., *University of Chicago*, 1907 *Ann Arbor*
Pure Mathematics; Applied Mathematics; Astronomy.
- ||Katherine Cecilia Post *Holland*
European History; Education; American History.
- Frank Fraser Potter, A.B., 1902, A.M., 1903 *Ann Arbor*
Latin; Greek; Ancient Philosophy.
- Franklin Uriah Quillin, A.B., *Ohio Wesleyan University*, 1903, A.M., *Harvard University*, 1905 *Ypsilanti*
American History; Sociology; Economics.
- James Garfield Randall, A.B., *Butler College*, 1903, A.B., *University of Chicago*, 1903, A.M., *ibid.*, 1904 *Indianapolis, Ind.*
American History; European History; Sociology.
- ‡William Ober Raymond, A.B., *University of New Brunswick*, 1902 *Saint John, N. B.*
Philosophy of Religion; Metaphysics; Hebrew.
- Luella Jane Read, B.L., *Tabor College*, 1898, A.B., 1902, A.M., 1903 *Ann Arbor*
German Literature; Germanic Philology; History.
- *Anna Caroline Reding, A.B., 1905 *Hubbell*
German; Latin; French.
- Jay Theodore Reed, A.B., 1908 *Detroit*
Chemical Technology; Organic Chemistry; Philosophy.
- Dexter Belden Reynolds, A.B., *Park College*, 1906 *Helena, Mont.*
Forest Management; Silviculture; Forest Mensuration.
- Daniel Leslie Rich, A.B., *Waynesburg College*, 1902 *Pittsburg, Pa.*
Physics; Electrical Engineering; Mathematics.
- Annie L. Richardson, B.L., *Mount Holyoke College*, 1897, A.B., *ibid.*, 1898 *East Northfield, Mass.*
Rhetoric; English Literature; Philosophy.

- *Homer Elmer Robbins, A.B., 1905, A.M., 1906 *Ann Arbor*
 Latin; Greek; Sanscrit.
- Charles Summers Robinson, A.B., 1907 *Chicago, Ill.*
 Organic Chemistry; Physical Chemistry; Physics.
- Floyd W. Robison, B.S., *Michigan Agricultural College*, 1898 *East Lansing*
 Physiological Chemistry; Hygiene; Organic Chemistry.
- *Irma Rodi, A.B., 1908 *Calumet*
 Philosophy; Psychology; English.
- Gertrude Louise Roper, A.B., 1904 *Detroit*
 Physics; Mathematics; Astronomy.
- Henrietta Elizabeth Rosenthal, A.B., 1908 *Ann Arbor*
 Latin; German; Greek.
- Bessie Saxton, A.B., 1908 *Blissfield*
 Latin; German Literature; German Philology.
- Mabel Hoffmann Schell, A.B., *University of Cincinnati*, 1903 *Cincinnati, O.*
 Plan B (German; French).
- Otto Hugo Adolf Schenk, A.B., 1908 *Brantford, Ont.*
 Mineralogy; Chemistry; Geology.
- †Paul Adolph Schule, A.B., *University of Wisconsin*, 1904 *Chicago, Ill.*
 Bacteriology; Hygiene; Organic Chemistry.
- *Reuben Valentine Schmitt, A.B., *Capital University (Columbus, O.)*, 1896, B.D., *ibid.*, 1899 *Columbus, O.*
 Latin; Greek; Comparative Philology.
- Irving Day Scott, A.B., *Oberlin College*, 1900, A.M., 1907 *Ann Arbor*
 Geology; Physiography; Mineralogy.
- Roy Wood Sellars, A.B., 1903 *Ann Arbor*
 Metaphysics; History of Philosophy; Sociology.
- Clara Belle Shaffer, A.B., *Albion College*, 1907 *Albion*
- ||Rachel Euphemia Sinclair *Port Huron*
- Edythe Viola Smeeth, A.B., 1907 *Ann Arbor*
 German Literature; Rhetoric; Germanic Philology.
- Alida Smith, A.B., *Simpson College*, 1907 *Derby, Ia.*
 Latin; German; Greek.
- Benjamin Franklin Smith, A.B., 1908 *Toledo, O.*
 English; Rhetoric; Philosophy.
- *Josephine Clare Smith, A.B., *University of Cincinnati*, 1903, A.M., *ibid.*, 1907 *Cincinnati, O.*
 German; French; English.
- Lisle D. Smith, A.B., *Albion College*, 1905 *Lansing*
 Physics; Organic Chemistry; Physical Chemistry.
- Thomas Claude Spaulding, B.S., *University of Montana*, 1906 *Missoula, Mont.*
 Forest Management; Silviculture; Forest Mensuration.
- †Gertrude E. Spencer, A.B., 1907 *Webberville*
 German Literature; Germanic Philology; Education.

- Adaline Eugenia Stanley, B.S., *Lebanon University*, 1902, A.B., *ibid.*, 1906 *Stanleyville, O.*
Education; English; Geology.
- ¶John Wallace Stephen, A.B., 1907 *Salamanca, N. Y.*
Forest Management; Silviculture; Forest Mensuration.
- Norman Hamilton Stewart, A.B., *University of Rochester*, 1908 *Rochester, N. Y.*
Zoology; Botany; Zoology.
- Sidney Smith Stewart, A.B., *Wabash College*, 1906 *Avilla, Ind.*
Forest Management; Silviculture; Forest Mensuration.
- Juliet Williston Stockbridge, A.B., 1906 *Ann Arbor*
Latin; Roman Law; Greek.
- *Herbert John Stockton, A.B., *Allegheny College*, 1904 *Meadville, Pa.*
Latin; Greek; Comparative Philology.
- *Thurman Wendell Stoner, A.B., 1908 *Leadville, Colo.*
Sociology; American History; Political Philosophy.
- ¶Julia Loretta Stott *Detroit*
American History; Rhetoric; Political Economy.
- *Harry Bryan Stover, A.B., 1906 *Valley Falls, N. Y.*
French Literature; German Literature; French Philology.
- Arthur Floyd Strome, A.B., 1904 *Ann Arbor*
American History; European History; English Literature.
- *Mary Clare Sullivan, A.B., 1906 *Lake Linden*
European History; American History; Latin.
- Olive May Sutherland, A.B., 1908 *Detroit*
Latin; Greek; German.
- *Rose Marguerite Taylor, A.B., 1908 *Negaunee*
Botany; Plant Pathology; Zoology.
- *Ernest Wood Thornton, B.S., *Alabama Polytechnic Institute*, 1907 *Auburn, Ala.*
Physical Chemistry; Analytical Chemistry; Mineralogy.
- *Samuel Thurman, A.B., *Harvard University*, 1903 *Kalamazoo*
Philosophy; Aesthetics; Semitics.
- Harry Conrad Thurnau, A.B., 1899, A.M., 1903 *Ann Arbor*
German Literature; Germanic Philology; English Literature.
- Ora Travis, A.B., 1904, A.M., 1905 *Ann Arbor*
Latin; Greek; Roman Law.
- William Everett Trebilcock, A.B., 1908 *Negaunee*
American History; European History; Government.
- ¶Oscar Stuart Trumble, A.B., 1906 *Davison*
American History; English History; Political Economy.
- Louisa Amelia Van Dyke, A.B., 1904 *Greencastle, Ind.*
Mathematics; Physics; Education.
- *Agnes Carr Vaughan, A.B., *Galloway College*, 1907 *Ann Arbor*
Greek; French.
- *Olga Olive von Zellen, A.B., 1895 *L'Anse*
Aesthetics; English; English History.

- Julius F. Vornholt, A.B., *Ohio State University*, 1898
Philosophy of Religion; Ethics; Hellenistic Greek. *New Bremen, O.*
- ||Martha Lucia Wagner
German Literature; Germanic Philology; American History. *Monroe*
- *Isabel Mary Wait, A.B., 1907
Plan B (French; German). *Sturgis*
- Howard George Walker, A.B., 1908
Plan B (Chemistry; Geology). *Madrid, N. Y.*
- Carolyn True Warren, A.B., *Lake Erie College*, 1906
Psychology; Mathematics; English. *Detroit*
- *Royden E. Webster, A.B., *Albion College*, 1904
Physics; Chemistry; Mathematics. *Iron Mountain*
- Frederick William Weck, A.B., *Indiana University*, 1905, A.M., 1907
German Literature; Germanic Philology; English. *Ann Arbor*
- *James Erwin Weyant, A.B., *Albion College*, 1901
Physics; Physical Chemistry; Physics. *Calumet*
- *Willis Hamel Wilcox, Ph.B., 1896, Ph.M., 1898
English; Education; Aesthetics. *Baltimore, Md.*
- †Frankwood Earl Williams, A.B., *University of Wisconsin*, 1907
Bacteriology; Physiology; History. *Orchard Lake*
- Levi Philip Ray Willoughby, A.B., 1900
Geology; Mineralogy; Botany. *Detroit*
- *John E. Winter, A.B., 1906
Psychology; Philosophy; Education. *Holland*
- †Charles Henry Woolbert, A.B., *Northwestern University*, 1900
English; Oratory; Rhetoric. *Albion*
- Gertrude Worden, A.B., *Hillsdale College*, 1908
Plan B (English; Philosophy). *Hillsdale*
- *James Snowden Worrall, B.S., *Ohio Wesleyan University*, 1907
English; German; Education. *Delaware, O.*
- Elizabeth Dorothy Wuist, A.B., 1908
Plan B (Botany; Zoology; Education). *Dayton, O.*
- *Merle Carlyle Yokom, A.B., *Albion College*, 1903
History of Education; Philosophy; Education. *Rochester*
- John Zedler, A.B., *Albion College*, 1903
A.M., 1908
German Literature; Germanic Philology; English Literature. *Albion*

SUMMARY

HIGHER DEGREES CONFERRED IN 1908

Master of Arts	36
Master of Science	3
Master of Science in Forestry	5
Doctor of Philosophy	4
	<hr/>
Total	48

STUDENTS IN THE GRADUATE SCHOOL

1908-1909

Academic Session of 1908-1909.....	186
Summer Session of 1908	93
	<hr/>
	279
Deduct for names counted twice	21
	<hr/>
Total	258

Adrian College	2	Rio Grande College	1
Alabama Polytechnic Institute	1	Ripon College	1
Albion College	13	Rutgers College	1
Alfred University	1	Simpson College	1
Allegheny College	2	Smith College	1
Alma College	1	Southwestern College (Kan-	
Antioch College	2	sas)	1
Bethany College	1	State University of Iowa...	1
Brown University	1	Tabor College	1
Butler College	2	Union College (Nebraska)..	1
Capital University (Colum-		University of Berlin	1
buss, O.)	2	University of California	1
Central College (Indiana) ..	3	University of Chicago	4
Clark University	2	University of Cincinnati	4
Dartmouth College	1	University of Denver	1
Earlham College	1	University of Illinois	1
Galloway College	1	University of Kansas	1
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sity	1	University of Mississippi ...	1
German Wallace College....	1	University of Missouri	1
Greenville College	1	University of Montana	1
Harvard University	3	University of New Bruns-	
Haverford College	1	wick	1
Hillsdale College	4	University of Rochester	3
Hiram College	1	University of South Dakota..	1
Hobart College	1	University of the South....	1
Hope College	3	University of Toronto	1
Indiana University	2	University of Vermont	1
Lake Erie College	1	University of Washington ..	1
Lebanon University	2	University of Wisconsin ...	2
Leland Stanford Junior		University of Wooster	1
University	1	Wabash College	1
Lombard College	1	Washburn College	1
Marietta College	1	Washington and Jefferson	
Miami University	2	College	2
Michigan Agricultural Col-		Waynesburg College	1
lege	2	Wellesley College	1
Mount Holyoke College	4	Western College for Women	2
Northwestern University ...	2	Western Reserve University	3
Oberlin College	3	Westminster College	1
Ohio Wesleyan University..	4	Wittenberg College	2
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Other Announcements of the several departments of instruction, Reports of University officers, etc.

- Adaline Eugenia Stanley, B.S., *Lebanon University*, 1902, A.B., *ibid.*, 1906 *Stanleyville, O.*
Education; English; Geology.
- ¶John Wallace Stephen, A.B., 1907 *Salamanca, N. Y.*
Forest Management; Silviculture; Forest Mensuration.
- Norman Hamilton Stewart, A.B., *University of Rochester*, 1908 *Rochester, N. Y.*
Zoology; Botany; Zoology.
- Sidney Smith Stewart, A.B., *Wabash College*, 1906 *Avilla, Ind.*
Forest Management; Silviculture; Forest Mensuration.
- Juliet Williston Stockbridge, A.B., 1906 *Ann Arbor*
Latin; Roman Law; Greek.
- *Herbert John Stockton, A.B., *Allegheny College*, 1904 *Meadville, Pa.*
Latin; Greek; Comparative Philology.
- *Thurman Wendell Stoner, A.B., 1908 *Leadville, Colo.*
Sociology; American History; Political Philosophy.
- ¶Julia Loretta Stott *Detroit*
American History; Rhetoric; Political Economy.
- *Harry Bryan Stover, A.B., 1906 *Valley Falls, N. Y.*
French Literature; German Literature; French Philology.
- Arthur Floyd Strome, A.B., 1904 *Ann Arbor*
American History; European History; English Literature.
- *Mary Clare Sullivan, A.B., 1906 *Lake Linden*
European History; American History; Latin.
- Olive May Sutherland, A.B., 1908 *Detroit*
Latin; Greek; German.
- *Rose Marguerite Taylor, A.B., 1908 *Negaunee*
Botany; Plant Pathology; Zoology.
- *Ernest Wood Thornton, B.S., *Alabama Polytechnic Institute*, 1907 *Auburn, Ala.*
Physical Chemistry; Analytical Chemistry; Mineralogy.
- *Samuel Thurman, A.B., *Harvard University*, 1903 *Kalamazoo*
Philosophy; Aesthetics; Semitics.
- Harry Conrad Thurnau, A.B., 1899. A.M., 1903 *Ann Arbor*
German Literature; Germanic Philology; English Literature.
- Ora Travis, A.B., 1904, A.M., 1905 *Ann Arbor*
Latin; Greek; Roman Law.
- William Everett Trebilcock, A.B., 1908 *Negaunee*
American History; European History; Government.
- †Oscar Stuart Trumble, A.B., 1906 *Davison*
American History; English History; Political Economy.
- Louisa Amelia Van Dyke, A.B., 1904 *Greencastle, Ind.*
Mathematics; Physics; Education.
- *Agnes Carr Vaughan, A.B., *Galloway College*, 1907 *Ann Arbor*
Greek; French.
- *Olga Olive von Zellen, A.B., 1895 *L'Anse*
Aesthetics; English; English History.

- Julius F. Vornholt, A.B., *Ohio State University*, 1898 *New Bremen, O.*
Philosophy of Religion; Ethics; Hellenistic Greek.
- ||Martha Lucia Wagner *Monroe*
German Literature; Germanic Philology; American History.
- *Isabel Mary Wait, A.B., 1907 *Sturgis*
Plan B (French; German).
- Howard George Walker, A.B., 1908 *Madrid, N. Y.*
Plan B (Chemistry; Geology).
- Carolyn True Warren, A.B., *Lake Erie College*, 1906 *Detroit*
Psychology; Mathematics; English.
- *Royden E. Webster, A.B., *Albion College*, 1904 *Iron Mountain*
Physics; Chemistry; Mathematics.
- Frederick William Weck, A.B., *Indiana University*, 1905, A.M., 1907 *Ann Arbor*
German Literature; Germanic Philology; English.
- *James Erwin Weyant, A.B., *Albion College*, 1901 *Calumet*
Physics; Physical Chemistry; Physics.
- *Willis Hamel Wilcox, Ph.B., 1896, Ph.M., 1898 *Baltimore, Md.*
English; Education; Aesthetics.
- †Frankwood Earl Williams, A.B., *University of Wisconsin*, 1907 *Orchard Lake*
Bacteriology; Physiology; History.
- Levi Philip Ray Willoughby, A.B., 1900 *Detroit*
Geology; Mineralogy; Botany.
- *John E. Winter, A.B., 1906 *Holland*
Psychology; Philosophy; Education.
- †Charles Henry Woolbert, A.B., *Northwestern University*, 1900 *Albion*
English; Oratory; Rhetoric.
- Gertrude Worden, A.B., *Hillsdale College*, 1908 *Hillsdale*
Plan B (English; Philosophy).
- *James Snowden Worrall, B.S., *Ohio Wesleyan University*, 1907 *Delaware, O.*
English; German; Education.
- Elizabeth Dorothy Wuist, A.B., 1908 *Dayton, O.*
Plan B (Botany; Zoology; Education).
- *Merle Carlyle Yokom, A.B., *Albion College*, 1903 *Rochester*
History of Education; Philosophy; Education.
- John Zedler, A.B., *Albion College*, 1903 *Albion*
A.M., 1908
German Literature; Germanic Philology; English Literature.

SUMMARY

HIGHER DEGREES CONFERRED IN 1908

Master of Arts	36
Master of Science	3
Master of Science in Forestry	5
Doctor of Philosophy	4
	<hr/>
Total	48

STUDENTS IN THE GRADUATE SCHOOL

1908-1909

Academic Session of 1908-1909.....	186
Summer Session of 1908	93
	<hr/>
	279
Deduct for names counted twice	21
	<hr/>
Total	258

COLLEGES AND UNIVERSITIES REPRESENTED

Adrian College	2	Rio Grande College	1
Alabama Polytechnic Institute	1	Ripon College	1
Albion College	13	Rutgers College	1
Alfred University	1	Simpson College	1
Allegheny College	2	Smith College	1
Alma College	1	Southwestern College (Kan-	
Antioch College	2	sas)	1
Bethany College	1	State University of Iowa...	1
Brown University	1	Tabor College	1
Butler College	2	Union College (Nebraska)..	1
Capital University (Colum-		University of Berlin	1
buss, O.)	2	University of California	1
Central College (Indiana) ..	3	University of Chicago	4
Clark University	2	University of Cincinnati	4
Dartmouth College	1	University of Denver	1
Earlham College	1	University of Illinois	1
Galloway College	1	University of Kansas	1
George Washington Univer-		University of Michigan.....	139
sity	1	University of Mississippi ...	1
German Wallace College....	1	University of Missouri	1
Greenville College	1	University of Montana	1
Harvard University	3	University of New Bruns-	
Haverford College	1	wick	1
Hillsdale College	4	University of Rochester	3
Hiram College	1	University of South Dakota.	1
Hobart College	1	University of the South....	1
Hope College	3	University of Toronto	1
Indiana University	2	University of Vermont	1
Lake Erie College	1	University of Washington ..	1
Lebanon University	2	University of Wisconsin ...	2
Leland Stanford Junior		University of Wooster	1
University	1	Wabash College	1
Lombard College	1	Washburn College	1
Marietta College	1	Washington and Jefferson	
Miami University	2	College	2
Michigan Agricultural Col-		Waynesburg College	1
lege	2	Wellesley College	1
Mount Holyoke College	4	Western College for Women	2
Northwestern University ...	2	Western Reserve University	3
Oberlin College	3	Westminster College	1
Ohio Wesleyan University..	4	Wittenberg College	2
Ohio State University	1	Yale University	1
Olivet College	3		
Park College	1		276
Peking University (China)..	1	Deduct	18
Penn College.....	1		
Princeton University	1	Total	258

Pathogenic Protozoa.

The work in protozoology is given in the second half of the second semester and follows Course 1, which must precede it. Special attention is given to the study of the blood parasites, such as trypanosomes, plasmodia, piroplasmes, hemogregarines, etc. The spirochetes are also taken up in this course. As far as practicable infected animals are provided for the student and an opportunity is given to do experimental work with insect hosts, as mosquitoes, ticks, etc.

Research in Bacteriology and Protozoology.

Advanced Physiological Chemistry.

Laboratory work and reading.—*Second semester.*

HIGHER DEGREES CONFERRED IN 1908

MASTER OF ARTS

James Howard Agnew, A.B.	Paul Van Brunt Jones, A.B.
Edith Emma Atkins, A.B.	Clyde L. King, A.B.
Willard Titus Barbour, A.B.	Edith Wilmar Kinnan, A.B.
Floyd E. Bartell, A.B., <i>Albion College</i>	Marjorie Kinnan, A. B.
Lawrence Ray Boyer, A.B.	Arthur Charles Klockslem, A.B., <i>German Wallace College;</i>
Gail Luke Carver, A.B.	A.M., <i>ibid</i>
Isaac Merton Cochran, A.B.	Helen Rose Lang, B.L.
Arthur Charles Cole, A.B.	George Allan Lindsay, A.B.
Maynie Rose Curtis, A.B.	Clyde Elton Love, A.B.
Frank William Douglas, A.B., <i>Albion College.</i>	Alice Malone, A.B.
Esson McDowell Gale, A.B.	Burl Garfield Martin, A.B.
Olive May Gilbreath, A.B., <i>Wellesley College</i>	Albert Taylor Mills, Ph.B.
Alexander Charles Gray, A.B., <i>University of Toronto; A.M., Hiram College</i>	Eugene Lyman Porter, A.B., <i>Harvard University</i>
Ottillie Kunigunde Grauer, A. B.	Esther Elizabeth Shaw, A.B., <i>Mount Holyoke College</i>
Minnie Olivia Hall, A.B.	Charles Everett Skinner, B.L.
Grace Angeline Harrington, A.B., <i>Oberlin College</i>	Arthur William Stalker, A.B.
Hildegard Jend, B.L., <i>German Wallace College</i>	Luella Townley, A.B.
	Frank Van Vliet, A.B.
	Dwight Everett Watkins, A.B.
	John Zedler, A.B., <i>Albion College</i>

MASTER OF SCIENCE

Glenn B. Britton, A.B.	Charles Alexander Vallance, A.B.
John Edward Tanis, A.B., <i>Kalamazoo College</i>	

MASTER OF SCIENCE IN FORESTRY

Asa Lee Brower, B.S., <i>Morningside College</i>	Julius Frank Kimmel, A.B.
John Robert Dickson, A.B.	Roy Gifford Pierce, A.B., <i>University of Nebraska</i>
Peter Keplinger, Ph.B., <i>Colorado College</i>	

DOCTOR OF PHILOSOPHY

John Cerenus Bordner, A.B., <i>University of Indiana, 1904; Dexter M. Ferry Fellow in Botany</i>
Botany; Forestry; Analytical Chemistry.
<i>Thesis, The Influence of Constant Longitudinal Traction on the Formation of Mechanical Tissue in Stems</i>

Albert Robinson Crittenden, A.B., 1894; A.M., 1902; *Peter White Classical Fellow*

Latin; Philosophy; Education.

Thesis, Sentence Structure in Virgil

Alvin Eleazer Evans, A.B., *Cotner University*, 1896; A.M., *University of Nebraska*, 1898; *Buhl Classical Fellow*

Latin; Roman Law; Greek.

Thesis, Roman Law in Livy.

Manson Alexander Stewart, A.B., 1903; A.M., 1904

Latin; Greek; Ancient Philosophy.

Thesis, Word Study in Latin Abstracts

HOLDERS OF FELLOWSHIPS, 1908-1909

Arthur William Linton,¹ Ph.G. (*Highland Park College*), *Stearns Fellow in Pharmaceutical Chemistry*

Ray Eli Cleveland, A.B., *Buhl Classical Fellow*

Harriet Rice Congdon, A.B. (*Mount Holyoke College*), *Peter White Classical Fellow*

Henry Mills Gelston, A.B., *Buhl Classical Fellow*

John Nelson Norwood, A.B. (*Alfred University*), *Peter White Fellow in American History*

William Alder Perkins,² *Rockefeller Fellow in Hygiene and Bacteriology*

Charles Bruce Vibbert, A.B., *George S. Morris Fellow in Philosophy*

William Albert Dunkley,³ B.S., *Gas Engineering Fellow*

¹ Registered in the Department of Pharmacy.

² Registered in the Department of Medicine.

³ Registered in the Department of Engineering.

STUDENTS IN THE GRADUATE SCHOOL 1908-1909¹

*Florence Lavinia Abbott, Ph.B., 1899 Mathematics; Physics; English.	<i>Ann Arbor</i>
John Quincy Adams, B.L., 1894, LL.B., 1898 English Oratory; English Drama; English History.	<i>Alma</i>
Herbert Francis Allen, A.B., <i>University of South Dakota</i> , 1905, A.M., <i>ibid.</i> , 1906 English; Rhetoric; German Literature.	<i>Vermillion, S. Dak.</i>
Elizabeth Melvina Andrews, A.B., <i>Le- land Stanford, Jr., University</i> , 1908 Plan B (Mathematics; Education; German).	<i>Corona, Cal.</i>
Bessie Annis, A.B., <i>University of Wash- ington</i> , 1905 Rhetoric; English Literature; Philosophy.	<i>Kennebec, Wash.</i>
Cornelius K. Baarman, A.B., <i>Hope College</i> , 1903, A.B., 1904 Plan B (Physics; Mathematics).	<i>Zeeland</i>
Grace Mabel Bacon, A.B., <i>Mount Holyoke College</i> , 1901 German Literature; German Philology; English Literature.	<i>Dorchester, Mass.</i>
*Grace Wilder Bailey, Ph.B., Pd.B., <i>Hills- dale College</i> , 1900 Chemistry; Zoology; Physics.	<i>Hillsdale</i>
George Latta Barrus, B.S., <i>University of Rochester</i> , 1906 Forestry; Mechanical Engineering; Botany.	<i>Charlotte, N. Y.</i>
Floyd Earl Bartell, A.B., <i>Albion College</i> , 1905, A.M., 1908 Physical Chemistry; Analytical Chemistry; Mineralogy.	<i>Concord</i>
*William Beachler, B.S., <i>Lebanon Univer- sity</i> , 1888, B.L., <i>Earlham College</i> , 1899 Education; Philosophy; Education.	<i>Decatur, Ind.</i>
*Arthur Emmons Bellis, A.B., 1907 Physics; Mathematics; Electrical Engineering.	<i>Laramie, Wyo.</i>

¹ The subjects of study pursued by candidates for an advanced degree are indicated under their respective names, the subject first named being the major study. If a candidate for a master's degree is pursuing his work under Plan B (see p. 17), his subjects of study are given in parentheses. Unmarked names indicate students enrolled during the academic session of 1908-1909; those with an asterisk (*) were members of the Summer Session of 1908 only; names marked with a dagger (†) indicate students who were enrolled in both the Summer Session of 1908 and the academic session of 1908-1909; (¶) shows that the student was permitted to complete a portion of his studies *in absentia*; names marked with parallels (||) are students who completed their undergraduate course in February, 1909, but will not take their degrees until the following commencement in June; the double dagger (‡) indicates registration in the Department of Medicine and Surgery also.

- *Edith Inez Beman, Ph.B., *Western Reserve University*, 1901 *Cleveland, O.*
Mathematics; Philosophy; Geology.
- John Knight Munroe Berry, A.B., 1901, A.M., 1902 *Detroit*
German Literature; Germanic Literature; Latin.
- Grace Darling Bissell, A.B., 1904 *Ann Arbor*
Rhetoric; Sociology; English.
- Webster Edwin Bliss, A.B., 1908 *Deerfield*
Rhetoric; English Literature; Philosophy.
- *James Irvén Bricker, A.B., *Hillsdale College*, 1894 *Saginaw, West Side*
Botany; Plant Ecology; Zoology.
- Harold Prell Breitenbach, A.B., 1901, A.M., 1903 *Ann Arbor*
Rhetoric; Aesthetics; English Literature.
- Harvey Clayton Brill, A.B., *Miami University*, 1908 *Camden, O.*
General Chemistry; Mineralogy; Physical Chemistry.
- Glenn B. Britton, A.B., *Miami University*, 1906, A.B., 1907, M.S., 1908 *Oxford, O.*
General Chemistry; Physical Chemistry; Mineralogy.
- !Heartie Earle Brown, A.B. *East Lansing*
English; Rhetoric; Education.
- Loretta Agatha Brown, A.B., 1905 *Port Huron*
German; English; American History.
- Louise Marie Hubbard Bruner, A.B., *Oberlin College*, 1906 *Port Byron, Ill.*
Botany; Plant Physiology; Classical Archaeology.
- *Charles Winfield Burchard, A.B., *Allegheny College*, 1908 *Guys Mills, Pa.*
General and Physical Chemistry; Physics; Mathematics.
- Minnie Antoinette Burgoyne, A.B., 1909 *Bridgeport*
Plan B (History and English).
- Philip Everette Bursley, A.B., 1902 *Fort Wayne, Ind.*
French; English History.
- *Karl George Adolf Busch, B.S., *Capital University (Columbus, O.)*, 1903, A.B., *ibid.*, 1904 *Woodville, O.*
German Literature; German Philology; English Literature.
- *Harvey Blaine Campbell, B.S., 1907 *Louisville, Ky.*
Physics; Chemistry.
- Robert John Carney, A.B., 1907 *Sturgis*
Analytical Chemistry; Organic Chemistry; Physics.
- *Jesse Bryant Carpenter, A.B., 1902 *Louisville, Ky.*
Latin; Greek; German.
- *Laura Augusta Carpenter, A.B., 1897 *Muskegon*
Plan B (Education).
- †Earl William Castle, A.B., 1907 *Ann Arbor*
Astronomy; Mathematics; Insurance.
- †William Dean Chadwick, A.B., *Marietta College*, 1905 *Albion*
Plan B (English Literature; Rhetoric).

- Clara Abigail Chase, A.B., 1902 *Ann Arbor*
English Literature; Rhetoric; English Philology.
- Chen Wei Cheng, A.B., *Peking University*
(*Peking, China*), 1896, A.M., *ibid.*,
1907 *Peking, China*
European History; International Law; Political Economy.
- *Lola Cherrington, B.S., *Rio Grande Col-*
lege, 1899 *Wellston, O.*
Botany; Mineralogy; Zoology.
- *Charles Atwood Clay, B.S., *Central Col-*
lege (Ubee, Ind.), 1907 *Huntington, Ind.*
Geology; Physics; Chemistry.
- Henry Ward Church, A.B., 1908 *Saint Joseph*
German Literature; German Philology; French.
- Harold Charles Clark, B.S., *Dartmouth*
College, 1908 *Keene, N. H.*
Forest Management; Silviculture; Forest Utilization.
- Ray Eli Cleveland, A.B., *State University*
of Iowa, 1906 *Cedar Falls, Ia.*
Latin; Greek; Ancient Philosophy.
- ||Alice Marie Coats *Detroit*
Plan B (English Literature; History).
- John Lewis Cobbs, Jr., A.B., *University of*
the South, 1907 *Montgomery, Ala.*
Forest Management; Silviculture; Botany.
- Harry Newton Cole, A.B., 1901, B. S.
(Ch.E.), 1906 *Ann Arbor*
Metallurgy; Physics; Chemical Technology.
- Harriet Rice Congdon, A.B., *Mount Hol-*
yoke College, 1898 *Rochester, N. Y.*
Greek; Latin; Philosophy.
- †Guy Conrey, A.B., 1908 *Anita, Ia.*
Physical Chemistry; Organic Chemistry; Physics.
- Charles Wilford Cook, A.B., 1904, M.S.,
1906 *Fenton*
Mineralogy; Chemistry; Geology.
- Irwin Wycliffe Cook, B.S., *Washburn Col-*
lege, 1907 *Oberlin, Kan.*
Forest Management; Silviculture; Forest Mensuration.
- Leigh Guillot Cooper, A.B., 1904 *Detroit*
American History; Economics; Political Science.
- Robert Craig, Jr., B.S., *Alma College*, 1908 *Sault Ste. Marie*
Forest Management; Silviculture; Forest Mensuration.
- *Clayton Archie Crandall, A.B., 1908 *Union City*
Plan B (Botany, Physics).
- Nellie Stewart Cronkhite, A.B., 1905 *Flint.*
- *D. Wilson Crouse, A.B., *Wittenberg Col-*
lege, 1900, A.M., *ibid.*, 1907 *Atchison, Kan.*
Physics; Electrical Engineering; Mathematics.
- *Frances Norton Curry, Ph.B., *University*
of Wooster, 1901 *Ann Arbor*
German Literature; German Philology; Education.

- †Ralph Emerson Danforth, A.B., 1908 *Westfield, N. J.*
Botany; Forest Mensuration; Silviculture.
- *Ralph Darner, A.B., *Wittenberg College*,
1905, A.M., *ibid.*, 1908 *Springfield, O.*
Physical Chemistry; Organic Chemistry; Mineralogy.
- ¶Wirt Edward Darrow *Ann Arbor*
Physics; Mathematics; Political Economy.
- John William DeBruyn, A.B., 1907 *Holland*
Sociology; Psychology; European History.
- ¶Herbert Fletcher DeCou, A.B., 1888, *Chicago, Ill.*
A.M., 1890
Greek; Latin; Italic Dialects.
- Howard de Forest, B.S., *Princeton University*, 1895, *New York, N. Y.*
Forest Management; Silviculture; Forest Mensuration.
- Henry Walstane de Nancrede, A.B., 1908 *Ann Arbor*
Forest Management; Silviculture; Forest Utilization.
- George Bion Denton, A.B., 1907 *Detroit*
European History; Rhetoric; Psychology.
- Ralph Devries, B.S. (E.E.), 1907 *Holland*
Physics; Mathematics; Astronomy.
- Richard de Zeeuw, A.B., *Hope College*,
1906, A. B., 1908 *Sioux Center, Ia.*
Botany; Plant Pathology; Zoology.
- ¶Andrew Jackson Dighton *Monticello, Ill.*
Romance Languages; Romance Literature; English Literature.
- Harriette May Dilla, A.B., 1908 *Ann Arbor*
Government; International Law; American Constitutional History.
- Robert James Dobson, A.B., *Albion College*, 1907 *Ann Arbor*
Physics; Chemistry; Mathematics.
- †Floyd Carlton Dockeray, A.B., 1907 *Ann Arbor*
Psychology; History of Philosophy; Sociology.
- *Frank William Douglas, A.B., *Albion College*, 1905 *Albion*
Metallurgy; Hygiene; Physics.
- Gayle Albert Dull, A.B., 1908 *Stratford, Ont.*
- Clara Belle Dunn, A.B., 1904 *Ann Arbor*
Rhetoric; English Literature; German.
- George Argo Duthie, A.B., 1908 *Grand Rapids*
Forest Management; Silviculture; Forest Mensuration.
- †William Duvon, A.B., *Hope College*, 1908 *Brandon, Wis.*
Botany; Plant Physiology; Chemistry.
- *Sheridan Williams Ehrman, B.L., 1896 *Decatur, Ill.*
Education; Philosophy; Sociology.
- Lucius Walter Elder, A.B., 1905 *Ann Arbor*
History of Modern Philosophy; Metaphysics; English.
- Alfred Lynn Ferguson, A.B., 1908 *Ann Arbor*
Physical Chemistry; Physics; Philosophy.
- *Frank Alexander Ferguson, A.B., 1908 *Alliance, O.*
Physics; Mathematics; Chemistry.
- Robert Trevor Ferguson, B.S., *Washington and Jefferson College*, 1908 *Washington, Pa.*
Forest Management; Silviculture; Dendrology.

- *William Andrew Ferguson, A.B., 1904 *Traverse City*
Physics; Analytical Chemistry; Mathematics.
- Charles Ney Filson, A.B., *Bethany College*, 1908 *Bethany, W. Va.*
European History; Philosophy of Religion; Sociology.
- Hortense Flexner, A.B., 1907 *Louisville, Ky.*
Rhetoric; German; Sociology.
- Earle R. Forrest, B.S., *Washington and Jefferson College*, 1908 *Washington, Pa.*
Forest Management; Silviculture; Dendrology.
- *Lewis Lovatus Forsythe, A.B., 1904 *Saint Louis*
History of Education; Educational Administration; Latin.
- *Charles Smalley Foster, A. B., A.M., *Antioch College*, 1906 *Fletcher, O.*
English; Rhetoric; Aesthetics.
- *Elbertie Foudray, B.S., *Northwestern University*, 1903 *Wyandotte*
Physics; Mathematics; Chemistry.
- David Friday, A.B., 1908 *Ann Arbor*
Political Economy; Sociology; American History.
- *Dorothy Fuerstenau, A.B., 1907 *Saginaw*
Plan B (German Literature; Latin).
- †James Edwin Fulcher, C.E., *University of Missouri*, 1886 *Ann Arbor*
Physics; Astronomy; Geology.
- Earl Garfield Fuller, A.B., 1908 *Ravenna*
American History; International Law; Political Economy.
- *Edward Everett Gallup, A.B., 1906 *Chelsea*
History of Education; Sociology; Psychology.
- William Van Nest Garretson, B.S., *Rutger's College*, 1902, M.S., *Yale University*, 1904 *Ann Arbor*
Pure Mathematics; Mechanics; Astronomy.
- Henry Mills Gelston, A.B., 1900 *Ann Arbor*
Latin; Greek; Ancient Philosophy.
- *Flora Belle George, B.L., *Ohio Wesleyan University*, 1894 *Toledo, O.*
English; Philosophy; Rhetoric.
- †Quinter Olen Gilbert, A.B., 1909 *Grundy Center, Ia.*
Zoology; Neurology; Bacteriology.
- Olive May Gilbreath, A.B., *Wellesley College*, 1906, A.M., 1908 *La Plata, Mo.*
Rhetoric; English; Philosophy.
- Solomon Francis Gingerich, A.B., *Indiana University*, 1905, A.M., *ibid.*, 1907 *Goshen, Ind.*
English; Rhetoric; Aesthetics.
- *Henry Newell Goddard, Ph.B., 1893 *Waukesha, Wis.*
Plan B (Botany).
- *Edna Grant, A.B., *Oberlin College*, 1904, A.M., 1906 *Cleveland, O.*
English Literature; Aesthetics; Rhetoric.

- *Alexander Charles Gray, A.B., *University of Toronto*, 1896, A.M., *Hiram College*, 1897
American History; Sociology; Ethics. *Eureka, Ill.*
- Ruth Curtis Greathouse
Bacteriology; Organic Chemistry; Greek. *Washington, D. C.*
- Clarence Wilson Greene, A.B., 1903, A.M., 1905
Physics; Mathematics; Electrical Engineering. *Albion*
- Charles Edward Griffin, A.B., *University of Denver*, 1902
Analytical Chemistry; Chemical Technology; Electrical Engineering. *Brighton, Colo.*
- George Andrew Gutches, B.S., *Hobart College*, 1906
Forest Management; Silviculture; Forest Mensuration. *Coldwater*
- Arthur Hamilton, A.B., *Harvard University*, 1907
French; Spanish; Italian. *Fort Wayne, Ind.*
- Herbert Aaron Hard, B.S., *Ohio Wesleyan University*, 1897
General and Physical Chemistry; Analytical Chemistry; Geology. *Ann Arbor*
- Ivan Frederick Harlow, A.B., 1908
Organic Chemistry; Chemical Technology; Physics. *Ann Arbor*
- †James Elmer Harris, A.B., 1908
Physical Chemistry; Organic Chemistry; Physics. *Bay City*
- †Wilmer Carlyle Harris, Ph.B., *University of Chicago*, 1904
American History; English History; Government. *Ann Arbor*
- || Lucia Caroline Harrison
Physiography; Mineralogy; American History. *Saginaw*
- *William Henry Hart, A.B., *Albion College*, 1904
Education; Philosophy; Education. *Princeton*
- *Ernest Clark Hartwell, A.B., *Albion College*, 1905
Political Economy; American History; Sociology. *Petoskey*
- Wilmot W. Glidden Hastings, A.B., *Clark University*, 1908
Forest Management; Silviculture; Forest Mensuration. *Montrose, Pa.*
- Edward William Headsten, A.B., 1908
Forest Management; Silviculture; Forest Mensuration. *Escanaba*
- Charles Augustus Heiss, A.B., *George Washington University*, 1908
Political Economy; Finance; German. *Washington, D. C.*
- Ada May Herr, A.B., *Southwestern College (Kansas)*, 1907
Plan B (American History; Sociology). *Krowa, Kan.*
- *Rose May Crandall Hess, Ph.B., 1898
German Literature; German Philology; Latin. *Traverse City*
- Martha Hill, A.B., *Western College for Women*, 1906
Plan B (Botany; German). *Madison, Ind.*

- Mary Taylor Hill A.B., *Western College for Women*, 1908 *Madison, Ind.*
 Latin; German; Roman Political Institutions.
- *Frances Powell Hooper, Ph.B., *University of Mississippi*, 1885 *Columbus, Miss.*
 Plant Ecology; Plant Physiology; Zoology.
- ||Arthur Sherwood Hopkins *Rome, N. Y.*
 Forest Management; Silviculture; Forest Mensuration.
- †Louis Allen Hopkins, A.B., *Butler College*, 1905, M.S., *University of Chicago*, 1906 *Ann Arbor*
 Pure Mathematics; Theoretical Applied Mathematics; Astronomy.
- Harry Garfield Houghton, A.B., 1906 *Oak Grove*
 Oratory; English; Rhetoric.
- Harry Hale Howett, Ph.B., *Antioch College*, 1904 *Osborn, O.*
 American History; English; Education.
- Walter Fred Hunt, A.B., 1904, A.M., 1905 *Ann Arbor*
 Mineralogy; Analytical Chemistry; Geology.
- Fred Walter Hunter, B.S., *University of Rochester*, 1907 *Rochester, N. Y.*
 Physical Chemistry; Organic Chemistry; Food Analysis.
- *Frank C. Janes, B.S., *Albion College*, 1898 *Williamston*
 Plan B (Education).
- †Jessie Gertrude Jennings, A.B., 1901, A.M., 1902 *Pontiac*
 English Literature; German.
- †Gertrude Marie Johnston, Ph.B., *University of Vermont*, 1906 *Ann Arbor*
 German; French; English Literature.
- Paul Van Brunt Jones, A.B., 1906, A.M., 1908 *Ann Arbor*
 European History; American History; English Literature.
- Ernest Victor Jotter, A.B., 1908 *Monroe, O.*
 Forest Management; Silviculture; Forest Utilization.
- †Emanuel Kahn, A.B., *University of Cincinnati*, 1901 *Grand Rapids*
 Sociology; Ethics; Philosophy of Religion.
- *Louis Ward Keeler, Ph.B., 1900 *Michigan City, Ind.*
 History of Education; Philosophy; Psychology.
- *Alfred Kenngott, *University of Zürich* *Saginaw*
 German Literature; German Philology; French Literature.
- Herbert Alden Kenyon, A.B., *Brown University*, 1904, A.M., *ibid*, 1905 *Ann Arbor*
 Romance Literature; Romance Philology; English Literature.
- Virgil Morrison Kime, A.B., 1906 *Ann Arbor*
 Political Economy; Accounts; Insurance.
- Ella Louise King, A.B., *Olivet College*, 1905 *Olivet*
 Plan B (English; Rhetoric).
- Frederica Dorothy Klingmann, A.B., 1908 *Ann Arbor*

- Arthur Charles Klocksien, A.B., *German*
Wallace College, 1898, A.M., *ibid*,
 1899; A.M., 1908 *Cleveland, O.*
 German Literature; Germanic Philology; English Literature.
- *Carrie Krell *Chelsea*
 Plan B (English Literature; German).
- *Erna Kruckemeyer, A.B., *University of*
Cincinnati, 1903 *Cincinnati, O.*
 Plan B (Latin).
- †Lucas Petrou Kyriakides, A.B., 1907 *Broussa, Turkey*
 Organic Chemistry; Physical Chemistry; Physics.
- Jessie Cogswell Laird, A.B., *Mount Holyoke*
College, 1906 *Ypsilanti*
 Plan B (German).
- Elmer S. Lake, A.B., *University of Illinois*,
 1907 *Athens, Ill.*
 Latin; English; Education.
- *Helen Rose Laig, B.L., 1900 *Indianapolis, Ind.*
 Aesthetics; German; English History.
- Edward Henry Lauer, A.B. 1906 *Peru, Ill.*
 German Literature; Germanic Philology; English Philology.
- *Dean Lawrence, A.B., 1903 *Alpena*
 American History; European History; Sociology.
- Sterling Andrus Leonard, A.B., 1908 *Dallas Center, Ia.*
 Rhetoric; Aesthetics; German.
- Mary Delia Lewis, A.B., *Smith College*,
 1894 *Worcester, Mass.*
 Rhetoric; English; Greek.
- *George Allan Lindsay, A.B., 1895 *Saint Louis, Mo.*
 Physics; Mathematics; Astronomy.
- *Fred Aaron Loew, B.S., *Central College*
(Indiana), 1902, B.S., *Michigan Agri-*
cultural College, 1904. *Ubee, Ind.*
 Botany; Mycology; Mineralogy.
- Clyde Elton Love, A.B., 1905, A.M., 1908 *Ann Arbor*
 Mathematics; Mathematical Physics; Theoretical Astronomy.
- George Washington Lyons, B.S., *University*
of California, 1907 *Ballard, Cal.*
 Forest Management; Silviculture; Forest Mensuration.
- †Donald P. McAlpine, A.B., *Lombard Col-*
lege, 1901 *Brooklyn*
 Education; English; Psychology.
- *Arthur Louis McCarty, A.B., 1908 *Huntertown, Ind.*
 Mathematics; Physics; Education.
- *John James McElree, A.B., *Westminster*
College, 1890 *New Wilmington, Pa.*
 Latin; Greek; Roman Political Institutions.
- Carroll Brown Malone, A.B., *Western Re-*
serve University, 1908 *Cleveland, O.*
 European History; English; Sociology.
- *La Verne Bidwell Mann, A.B., *Olivet*
College, 1901 *Detroit*
 Physics; Chemistry; Electrical Engineering.
- †Carl Eugene Marquardt *Saint Joseph*
 German Literature; Germanic Philology; French Literature.

- ||Ernest Jones Marshall *Baltimore, Md.*
Chemistry; Microscopy; Hygiene.
- Pauline Martin, A.B., *Olivet College*, 1903 *Ann Arbor*
German Literature; Germanic Philology; American History.
- Donald Maxwell Matthews, A.B., 1908 *Orange, N. J.*
Forest Management; Silviculture; Forest Mensuration.
- Frank John Mellencamp, A.B., 1903, A.M.,
1906 *Ann Arbor*
Physics; Physical Chemistry; Mathematics.
- *William Orville Mendenhall, A.B., *Penn*
College, 1900, A.M., *ibid.*, 1901, A.B.,
Haverford College, 1901 *Earlham, Ind.*
Mathematics; Insurance; Astronomy.
- Herma Louise Meyer, A.B., 1908 *Lincoln, Ill.*
German; French; Education.
- Hattie Lindsay Middaugh, A.B., 1908 *Cameron, Mo.*
Latin; Roman Political Institutions; English.
- *Emerson Romeo Miller, B.S., 1894, M.S.,
1895 *Auburn, Ala.*
Organic Chemistry; Pharmacognosy; Plant Physiology.
- *Harold Alexander Millican, A.B., *Green-*
ville College, 1906 *Spring Arbor*
Botany; Zoology; Ecology.
- Ina Annette Milroy, Ph.D., *University of*
Berlin, 1904 *Ann Arbor*
- Nellie Amanda Montgomery, A.B., *Hills-*
dale College, 1897 *Hillsdale*
Latin; German; Roman Political Institutions.
- William Daniel Moriarty, A.B., 1904,
A.M., 1905 *Ann Arbor*
Rhetoric; English; Aesthetics.
- William West Morris, A.B., 1908 *Chicago, Ill.*
Forest Management; Silviculture; Forest Mensuration.
- Chester Birney Morse, A.B., *Ripon Col-*
lege, 1905 *Saint Anthony, Idaho*
Forest Management; Silviculture; Forest Mensuration.
- Charles Allen Mummart, A.B., *Central Col-*
lege (Indiana), 1907, B.D., *ibid.*, 1908 *Huntington, Ind.*
Plan B (Semitics; Philosophy).
- Seaton Anderson Norcross, Ph.B., *Adrian*
College, 1903, A.B., 1907 *Ann Arbor*
- John Nelson Norwood, Ph.B., *Alfred Uni-*
versity, 1906 *Madison, Wis.*
American History; European History; Government.
- †Charles Walter Obee, Ph.B., *Adrian Col-*
lege, 1906, A.M., *ibid.*, 1908 *Ann Arbor*
Plan B (Zoology).
- *Christine Ortli, A.B., *Western Reserve*
University, 1906 *Cleveland, O.*
General Chemistry; Analytical Chemistry; History.
- Mahlon Ellsworth Olsen, A.B., 1905, A.M.,
1906 *Battle Creek*
Rhetoric; English; Aesthetics.

- Grace Amanda Osborne, A.B., 1906 *Mancelona*
English; Rhetoric; American History.
- Waldo Disraeli Parker, A.B., *Clark University*, 1905 *Worcester, Mass.*
Insurance; Mathematics; Political Economy.
- Carl Eugene Parry, A.B., 1905, A.M., 1907 *Ann Arbor*
Political Economy; Sociology; European History.
- ‡Max Minor Peet, A.B., 1908 *Iosco*
Zoology; Bacteriology; Zoology.
- †Leigh H. Pennington, A.B., 1907 *Ann Arbor*
Physiology; Mycology; Organic Chemistry.
- Charles Milton Perry, A.B., *Albion College*, 1900 *Coldwater*
Philosophy; Metaphysics; Economics.
- Hermon Carleton Pitton, B.S., *Union College (Nebraska)*, 1904 *Stanton*
American History; International Law; Political Economy.
- Vincent Collins Poor, A.B., *University of Kansas*, 1901, M.S., *University of Chicago*, 1907 *Ann Arbor*
Pure Mathematics; Applied Mathematics; Astronomy.
- ||Katherine Cecilia Post *Holland*
European History; Education; American History.
- Frank Fraser Potter, A.B., 1902, A.M., 1903 *Ann Arbor*
Latin; Greek; Ancient Philosophy.
- Franklin Uriah Quillin, A.B., *Ohio Wesleyan University*, 1903, A.M., *Harvard University*, 1905 *Ypsilanti*
American History; Sociology; Economics.
- James Garfield Randall, A.B., *Butler College*, 1903, A.B., *University of Chicago*, 1903, A.M., *ibid.*, 1904 *Indianapolis, Ind.*
American History; European History; Sociology.
- ‡William Ober Raymond, A.B., *University of New Brunswick*, 1902 *Saint John, N. B.*
Philosophy of Religion; Metaphysics; Hebrew.
- Luella Jane Read, B.L., *Tabor College*, 1898, A.B., 1902, A.M., 1903 *Ann Arbor*
German Literature; Germanic Philology; History.
- *Anna Caroline Reding, A.B., 1905 *Hubbell*
German; Latin; French.
- Jay Theodore Reed, A.B., 1908 *Detroit*
Chemical Technology; Organic Chemistry; Philosophy.
- Dexter Belden Reynolds, A.B., *Park College*, 1906 *Helena, Mont.*
Forest Management; Silviculture; Forest Mensuration.
- Daniel Leslie Rich, A.B., *Waynesburg College*, 1902 *Pittsburg, Pa.*
Physics; Electrical Engineering; Mathematics.
- Annie L. Richardson, B.L., *Mount Holyoke College*, 1897, A.B., *ibid.*, 1898 *East Northfield, Mass.*
Rhetoric; English Literature; Philosophy.

- *Homer Elmer Robbins, A.B., 1905, A.M.,
1906 *Ann Arbor*
Latin; Greek; Sanscrit.
- Charles Summers Robinson, A.B., 1907 *Chicago, Ill.*
(Organic Chemistry; Physical Chemistry; Physics.
- Floyd W. Robison, B.S., *Michigan Agricultural College*, 1898 *East Lansing*
Physiological Chemistry; Hygiene; Organic Chemistry.
- *Irma Rodi, A.B., 1908 *Calumet*
Philosophy; Psychology; English.
- Gertrude Louise Roper, A.B., 1904 *Detroit*
Physics; Mathematics; Astronomy.
- Henrietta Elizabeth Rosenthal, A.B., 1908 *Ann Arbor*
Latin; German; Greek.
- Bessie Saxton, A.B., 1908 *Blissfield*
Latin; German Literature; German Philology.
- Mabel Hoffmann Schell, A.B., *University of Cincinnati*, 1903 *Cincinnati, O.*
Plan B (German; French).
- Otto Hugo Adolf Schenk, A.B., 1908 *Brantford, Ont.*
Mineralogy; Chemistry; Geology.
- †Paul Adolph Schule, A.B., *University of Wisconsin*, 1904 *Chicago, Ill.*
Bacteriology; Hygiene; Organic Chemistry.
- *Reuben Valentine Schmitt, A.B., *Capital University (Columbus, O.)*, 1896, B.D., *ibid.*, 1899 *Columbus, O.*
Latin; Greek; Comparative Philology.
- Irving Day Scott, A.B., *Oberlin College*, 1900, A.M., 1907 *Ann Arbor*
Geology; Physiography; Mineralogy.
- Roy Wood Sellars, A.B., 1903 *Ann Arbor*
Metaphysics; History of Philosophy; Sociology.
- Clara Belle Shaffer, A.B., *Albion College*, 1907 *Albion*
- ‡Rachel Euphemia Sinclair *Port Huron*
- Edythe Viola Smeeth, A.B., 1907 *Ann Arbor*
German Literature; Rhetoric; Germanic Philology.
- Alida Smith, A.B., *Simpson College*, 1907 *Derby, Ia.*
Latin; German; Greek.
- Benjamin Franklin Smith, A.B., 1908 *Toledo, O.*
English; Rhetoric; Philosophy.
- *Josephine Clare Smith, A.B., *University of Cincinnati*, 1903, A.M., *ibid.*, 1907 *Cincinnati, O.*
German; French; English.
- Lisle D. Smith, A.B., *Albion College*, 1905 *Lansing*
Physics; Organic Chemistry; Physical Chemistry.
- Thomas Claude Spaulding, B.S., *University of Montana*, 1906 *Missoula, Mont.*
Forest Management; Silviculture; Forest Mensuration.
- †Gertrude E. Spencer, A.B., 1907 *Webberville*
German Literature; Germanic Philology; Education.